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The Illinois Central: A Centennial View

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WHISTLES BLEW and flags waved on the morning of February 10, 1951, as the Illinois Central Railroad officially opened its centennial celebration. Of the rail lines in the United States, many of which will be observing their centennials during this decade and those shortly to follow, none is more exciting or colorful than the "Main Line of Mid-America." The story of the Illinois Central is a record of transformation, growth, and progress adding much to the drama of transportation from the day of the covered wagon to the streamliner of the present.

Across the pages of Illinois Central history move some of the great leaders of this country in the past century, as well as a few of the more colorful personalities who have added zest to the American scene. With Abraham Lincoln, company attorney, heading the list the supporting cast includes George B. McClellan, Grenville Dodge, Sidney Breese, Allan Pinkerton, Roswell B. Mason, Ambrose E. Burnside, Nathaniel P. Banks, John A. Logan, and, for good measure, "Casey" Jones and Mark Twain.

This was the first railroad to receive a grant of public land, the first to carry on a large-scale colonization program, and the first to promote rail service to the Gulf region. Portions of this present-day system served under both Union and Confederate flags during the War Between the States, and probably did more than any other private agency to hasten the re-establishment of commercial relations be-

tween the North and the South, once the conflict was over.

Today the Illinois Central, with its affiliated lines, constitutes one of the vital north-south railroad systems of the country, extending the length of the Mississippi Valley from the Great Lakes to the Gulf of Mexico. As the "Main Line of Mid-America" it serves this vast region, which Alexis de Tocqueville once called "the most magnificent dwelling place prepared by God for man's abode." The Illinois Central operates 6,542 miles of main line and branches located in fourteen states of the Middle West and South, and it is one of the few major systems in the country operating in a predominantly north-south direction. Its main line links Chicago, focal point of twenty-three railroad systems and the world's greatest railroad center, with New Orleans, the Crescent City, second most important seaport in the country in value of commerce and itself served by eleven railroads.

Before glancing back over the centennial history of the "Main Line of Mid-America" let us briefly examine the factors which make a railroad significant, as well as prosperous, in our time.¹ The most trustworthy gauge of the economic health and efficiency of a rail line is a knowledge of the amount of traffic which moves over its route.

¹ For an excellent, full-length treatment of the history of the Illinois Central Railroad and its affiliated lines, see Carlton J. Corliss, *Main Line of Mid-America: The Story of the Illinois Central* (New York: Creative Age Press, 1950).

The sum total of operating revenues, whether derived from freight, passenger, express, baggage, or mail service, makes possible, in turn, payments for wages and salaries, purchase of new equipment, repair of property and rolling stock (including maintenance of way), taxes, debt retirement and dividends — in short, everything for which a railroad company spends its money.

Freight Traffic

The most important single characteristic of the freight traffic handled by the Illinois Central is its diversification. With the exception of coal, no particular commodity normally contributes as much as 10 percent of the total freight tonnage. In addition to the products of mine, forest, and farm, the road reaps the benefit of a widely varied and rapidly expanding industry over the entire line. Because of the nature of the territory served and the number of industries located along its route, the Illinois Central normally originates more traffic than it receives from connecting railroads. Approximately two-thirds of the total tonnage is originated along its own lines, and only about one-third is received from connecting lines.

An interesting aspect of the latter type of business is the so-called "bridge traffic" classification, i.e., the freight traffic received from connecting railroads and delivered to connecting railroads. Because of its north-south direction the Illinois Central lies across the lines of the principal east-west carriers that dominate the American railroad scene. It makes contact with 150 railroads at 500 connecting points between the Great Lakes and the Gulf. Thus

it is in the fortunate position of being able to offer numerous routes not only for traffic bound to points in its own territory, but also for traffic destined for locations served by others. The profitable bridge traffic results from the number of locations at which traffic exchange is accomplished and from the wide variety of commodities which find their way into this exchange.

A look at the tonnage totals of the Illinois Central will be enough to convince even the most casual observer that this route ranks high among the major coal-carrying roads of the country. Nearly half of its total tonnage derives from the transportation of coal. There are two important bituminous coal fields reached by the Illinois Central, one in Western Kentucky and the other in Southern Illinois, both of which are adequately served by the tracks of the "Main Line of Mid-America." Production in both these fields has been increased sharply in the last decade, largely as a result of the mechanization of mining operations, proper treatment of coal at the mines, and more aggressive merchandising methods — to which this railroad has contributed in a substantial way.

Because it serves so many different regions with varied climates, the Illinois Central is particularly fortunate in the diversity of its agricultural traffic. Such products as cotton, fruit, and vegetables, soybeans, potatoes, wheat, corn, and bananas figure prominently in its annual freight statistics. Meat and other packing-house products are likewise important items of traffic revenue. The company has played an important role in organizing and supporting agencies devoted to the

development of more diversified crops, and to the improvement in quality and yields of those already under cultivation. It has also pioneered a movement to improve the milk and beef herds in its territory by providing a widespread artificial as well as natural insemination service. The result has been not only to bring about a steady improvement in the quality of herds, but also to gather for the Illinois Central a considerable store of good will among cattle owners.

Lumber and other forest products also enter into the traffic total of this leading north-south carrier. Here again the Illinois Central has demonstrated its foresight and energy in developing and maintaining traffic by taking an active part in furthering reforestation in the South. It has perfected a small tree planter, several of which are available to southern farmers, and which facilitates the planting of new trees in a serious effort to keep southern forests on a perpetuating basis.

The vast number of varied manufacturing establishments served or reached by the Illinois Central extend along the entire line and compose a virtual roster of American industry. The company has in its employ qualified industrial engineers who not only solicit the location of new plants on its lines but also draft plans for developing the natural resources within its territory. In recent years a large number of important industrial plants have been established along the lines of the Illinois Central.

No summary of the traffic potential of this line in its centennial year would be complete without a reference to its promotion of an export-import business

with Latin-America. This export-import business, which now constitutes nearly 10 percent of all Illinois Central traffic, is a most unusual type of railroad promotion. Representatives of the company make frequent trips to Latin-American countries and endeavor to develop business opportunities for shippers served by the Illinois Central. On their return they travel throughout the territory served by the Illinois Central in order to bring to the attention of businessmen various opportunities for trade with regions they have visited. In addition, the company's representatives are often called upon to search out markets for particular United States products, and to establish business connections for the importation of Latin-American products which are desired by customers of the railroad.

Some idea of the results of this very active promotion of export-import traffic may be gathered from the fact that the Port of New Orleans advanced to a rank of second place in value of its commerce in 1948.

Passenger Traffic

Although for years freight revenue has accounted for the bulk of the operating revenue on the Illinois Central (just as it has on most American railroads), this company has not neglected or sacrificed its passenger service in any area where such service has continued to be profitable. The passenger service of the Illinois Central can be divided rather easily into three main categories, long-distance (or medium long-distance), commuter, and local service. It is the last of these categories which has suffered most grievously in recent decades, as the travel habits of

millions of Americans have been altered by the widespread availability and use of automobiles and motor buses. Consequently, local and branch-line passenger service has been seriously curtailed as railroads have been willing to abandon this type of business to their competitors. It may come as a surprise to learn that one hundred years after its founding no passenger trains operate over what was once the "main stem" of the charter lines of the Illinois Central Railroad between Centralia and Freeport through the agricultural heart of the Prairie State.

Suburban service on the Illinois Central is almost as old as the road itself. The community of Hyde Park (now well within the city limits) had been laid out some six miles south of Chicago during the same time that the Illinois Central was under construction, and an experimental round trip between the two locations was performed on June 1, 1856. The first suburban service west of the Alleghenies began regular operation between Chicago and Hyde Park on July 21, 1856.

From this early beginning, commuter service on the Illinois Central has grown to today's gigantic proportions. The great Chicago fire of 1871 was not an unmixed blessing for the company, as it increased the demand for homes outside the congested areas and stimulated the development of communities on the South Side.

The selection of Chicago as the site for the World's Columbian Exposition of 1893 and its location in the Jackson Park area meant that the Illinois Central would bear the main brunt of the transportation load. During the time that the Exposition was open the

Illinois Central operated 40,116 special World's Fair trains, and another 36,600 regular suburban trains, carrying altogether 19,142,911 people to, from, or in Chicago, between May 1 and October 31, 1893.

The most important improvement of the suburban service within the twentieth century was the program of electrification that was carried out between 1921 and 1926. Plans for the electrification of the commuter service were well advanced when World War I intervened. The project had to be postponed until the return of peace and the termination of control by the United States Railroad Administration.

The electrification of Illinois Central suburban train service, virtually completed by 1926, was accompanied by other long-range improvements, such as the elimination of street and highway grade crossings, and of railway grade crossings as well, for a distance of 28 miles south of the terminal area. The continued development of communities in the South Shore district, together with the extraordinary population growth in the area, is largely responsible for the steady increase of suburban traffic, which reached an all-time peak of 47,067,959 revenue passengers carried during 1947.

In the realm of swift, comfortable, long-distance passenger service the Illinois Central has more than held its own. Between Chicago and New Orleans, Miami, and Florida West Coast points (in cooperation with southern roads); and between Chicago and St. Louis, Waterloo, and Sioux City, Iowa, excellent coach and Pullman accommodations are offered by such well-known favorites as the Panama

Limited, the City of New Orleans, the City of Miami, the Seminole, the Daylight, the Green Diamond, the Night Diamond, the Hawkeye, and the Land o' Corn. During the past twenty years the Illinois Central has confined its acquisition of new passenger equipment almost entirely to the purchase of cars for its fleet of light-weight streamliners and most of those mentioned above are so equipped.

Motive Power

The "Main Line of Mid-America" is rapidly becoming unique in the matter of its motive power, for at the present moment the road has no great interest in, and certainly no long-range plan for, a major Dieselization program. True, most of its distance streamliners are powered by Diesel-electric locomotives, and the company has recently acquired many new Diesel switch engines, but for the backbone of its operations the Illinois Central is going along with the steam freight locomotive. Several factors help to account for this decision on the part of the management. First, the Illinois Central is fortunate in that its roadway is characterized by easy grades and relatively slight curvature that place practically no restriction in the way of efficient railroad operation, nor does it in any serious way limit freight train tonnages. In the second place, while the company is fully aware of the economies which result from complete Dieselization, it is also convinced that the use of steam power has been a vital force in encouraging coal traffic. The soundness of this program has been clearly demonstrated up to the present time. While coal traffic has grown substantially, the

ratio of transportation costs to total operating revenues has been held down remarkably well. In this respect, incidentally, the Illinois Central has done much better than most railroads of the United States since the end of World War II.

But certainly the most important factor is that the Illinois Central possesses a highly efficient and recently modernized fleet of steam locomotives. During the dark depression years of the mid-1930's it was faced with the serious alternatives of either buying a large number of new locomotives or of extensively modernizing those on hand. Recognizing the necessity for holding down costs, and appreciative of the fact that at the moment not all its locomotives were being kept busy moving the reduced traffic of the depression years, the company adopted the policy of modernization. An extended program of improvement and conversion was begun in 1935 which ultimately affected more than a thousand locomotives, and which found the Illinois Central meeting the traffic challenge of World War II with a fleet of steam locomotives so modernized as to meet the schedules of its sharpest competitors, and capable of handling the available traffic efficiently and economically.

Improved Finances

The remarkably strong financial position enjoyed today by the Illinois Central Railroad is not only a reflection of the high regard in which that company's securities have been held almost from the beginning of its history, but also an indication of the success of its long-range program aimed at the re-

duction of its bonded indebtedness through the use of earnings.

Doing what one Wall Street railroad security expert has called "an amazing job" of restoring its financial position endangered by the depression, the Illinois Central managed in the years between 1936 and 1951 to reduce its bonded indebtedness by more than a third. At the same time it was making improvements on its physical property and adding to its rolling stock. This was not accomplished without hardship, however, and between 1931 and 1950 common stockholders of the Illinois Central received nothing in dividends. It is the judgment of investment counselors that the road's efforts have borne fruit in that the company has today a much stronger physical and financial structure than would otherwise have been the case.

Historical Background

With the "Main Line of Mid-America" thus entering its second century of service rather well situated as regards traffic, equipment, and finances, let us examine the beginnings of this mid-century railroad giant of the Mississippi Valley. It is not possible to summarize adequately the early history of the Illinois Central Railroad without at least mentioning the shortcomings of internal transportation within Illinois, since these, it was feared, would seriously retard the economic development of the state.

The widespread interest in canals and river improvements, in road building, and soon thereafter in railroads points most clearly to the almost frenzied determination on the part of the young state to provide the necessary

facilities for transportation. At least fifteen years before the Illinois Central Railroad became a reality, public men in Illinois were promoting seriously the idea of a "great central railroad" which would link up the southern terminus of the Illinois and Michigan Canal with the important Ohio-Mississippi River junction at the southern tip of the state. The earliest efforts to construct a central Illinois railroad, however, ended in dismal failure with the complete collapse of the Illinois Internal Improvements Scheme of 1837. Subsequent attempts to construct a railroad under private auspices during the 1840's also came to naught in spite of the tireless efforts of Sidney Breese, Senator from Illinois, to win Congressional approval for a pre-emption scheme designed to aid the railroad builders.

The construction of the Illinois Central Railroad was made possible through a grant of 2,595,000 acres of public land to the state of Illinois. Senator Stephen A. Douglas was instrumental in getting the Federal Congress to agree to this step, and the proposal became law on September 20, 1850. The General Assembly of Illinois decided, in turn, to award the land grant, along with a charter to build and operate the railroad, to a group of eastern capitalists and railroad promoters headed by Robert Rantoul, Jr., of Massachusetts. The corporate existence of the Illinois Central Railroad dates from February 10, 1851, when the General Assembly approved and Governor Augustus C. French signed the charter which established the company.

Few railroads have been organized

under circumstances which augured for a more bright and prosperous future than was anticipated for the Illinois Central. The handsome grant of alternate sections of land six miles deep on either side of its two hundred-foot right of way made it the largest landlord in the state of Illinois next to the Federal government itself. In addition, the rich agricultural potential of the central and eastern counties of the state was just beginning to break through the stigma which had attached to the prairie lands almost from the beginning of white settlement in the West. This region, once described as the "lair of the wolf and the feeding ground of the deer," was soon to become one of the richest agricultural areas in the world. At that time, of course, an adequate understanding of either the mineral wealth of the Prairie State or its industrial possibilities was completely beyond the fondest imagination of even the most enthusiastic entrepreneur.

Nevertheless, in spite of these favorable factors which we now recognize as working for the success of this ambitious western railway, the projection and construction of the Illinois Central Railroad was a tremendous undertaking at the time. The magnitude of the operation may be judged from the fact that it contemplated building a mileage more than double that of any then existing railroad, and the tracks had to be laid through a relatively undeveloped and sparsely populated state. The population of Illinois was only 851,470 in 1850, and the Illinois Central and its contractors found it necessary to import some 100,000 men to work on the project. There were times

when as many as 10,000 workmen were engaged on various aspects of the road's construction.

Large numbers of these workers remained to purchase farms or establish homes in Illinois. Other thousands from Europe, as well as from the eastern states of the Union, were encouraged to come and settle on the railroad's land as a part of the vigorous publicity campaign carried on by the agents of the company's Land Department.²

Construction was pressed forward rapidly between 1852 and 1855, and the last spike in the "Charter Lines" was driven near Mason, Illinois, on September 27, 1856, well within the time limit laid down by the Act of Incorporation. This portion of today's Illinois Central System totals 705.5 miles of railroad and is still known as the "Charter Lines." Its main line ran northward from Cairo directly through the center of the state to a junction with the western end of the Illinois and Michigan Canal in the LaSalle-Peru vicinity. From there it proceeded in a northwesterly direction to reach the Mississippi River at Dunleith (now East Dubuque), Illinois. The Chicago branch (still so-called by many veteran railroaders, in spite of the fact that it has long since become the main line of the Illinois Central) departed from the main stem at a point just north of Centralia and, following a course remarkably free from curves or grades, reached the rapidly growing metropolis

² An excellent study of the land policy and the settlement program of the Illinois Central is to be found in Paul W. Gates, *The Illinois Central Railroad and Its Colonization Work* (Cambridge: Harvard University Press, 1934).

on the shores of Lake Michigan. In addition to opening the rich interior of Illinois to settlement and promoting agricultural development, the Illinois Central also operated as a year-round, all-weather connection between the Great Lakes-Upper-Mississippi region and Cairo, the "gateway to the South."

Much of the Congressional enthusiasm for the Illinois Central Railroad at the time of the passage of the land-grant act had been generated by the plan to extend the central railroad to the Gulf of Mexico at Mobile, Alabama. The successful passage of the Douglas-sponsored measure was due, in no small part, to the solid support given it by congressmen and senators from the Gulf States. One should never lose sight of the fact that the Illinois Central was designed, not as an end in itself, but as an important part of a boldly conceived transportation scheme which it was believed would bind together economically and commercially the rapidly developing West and Southwest.

The Mobile and Ohio Railroad, already in existence, fell heir to the land granted to the states of Alabama and Mississippi, and it was freely predicted that a traveler would soon be able to make a continuous rail journey from Chicago to Mobile, Alabama. Unfortunately, no guarantee of a physical connection or even a corporate union between the north and south lines was insisted upon, with the result that the ambitious program suffered at the very outset from a lack of long-range planning and coordinated effort—so necessary in a project of this kind.

The Illinois Central was deeply

interested in the development of a southern connection, and soon a spirited rivalry sprang up between the business interests in Mobile and in New Orleans. Both the Mobile and Ohio and a series of roads working north from New Orleans proceeded slowly toward a potential junction with the Illinois Central at Cairo. The New Orleans line reached Columbus, Kentucky, a small but thriving river community twenty miles below Cairo, on January 31, 1860, whereas the Mobile and Ohio Railroad was not completed to the same point until April 22, 1861, some days after the Fort Sumter episode had opened the American Civil War.³

The completion of the southern routes came too late to have any real bearing upon the commercial outlook in the immediate prewar years. Neither the Mobile and Ohio nor the lines to New Orleans had time to demonstrate how they would have exploited the new connection with the Northwest before war was upon them. Plans for the exchange of goods ceased with the outbreak of hostilities, and it remained for the postwar decades to see the southern lines develop as important avenues of north-south trade. The reconstruction of these lines and the new emphasis upon the southern connection are a vital part of the interesting story of Illinois Central development after 1870.

³ A more thorough coverage of many of these developments in the early history of the Illinois Central Railroad may be found in the author's doctoral dissertation entitled *The Illinois Central Railroad in Peace and War, 1858-1868*, manuscript copies of which are available in the University of Illinois Library.

Impact of the Civil War

The beginning of civil war in 1861 raised serious problems for the Illinois Central. The immediate result of the war was to interrupt the coordinated rail service which had so recently been established between the sections, and eventually to aim at the complete severance of those long-established lines of business and trade which followed the Mississippi River and its tributaries. Furthermore, there was the haunting fear that the wording of the company's charter would impose strange and burdensome obligations upon the operations of the road. Finally, with southern Illinois surrounded by slaveholding territory, and with troops of the Confederacy concentrated heavily in Kentucky and southeastern Missouri, the company's first aim was undoubtedly to protect Cairo and the southern portion of the line from attack. Indeed, the first active participation of the Illinois Central in the Union war effort was directed toward that very end, as several companies of Illinois militiamen were secretly moved from Chicago to the defense of Cairo and the strategic Ohio-Mississippi junction at that point early in May, 1861.

The Civil War raised a difficult question in the relationship between government and railroad with reference to the legal position of the land-grant lines. In the earliest Congressional grants of land for turnpikes and canals it was customary to insert a provision to the effect that these improvements should "be, and forever remain, a public highway for the use of the government, free from any toll or other charge whatever, for any property of the

United States, or persons in their service."

When the first Federal land grant for a railroad was passed in 1850, the form and spirit of the above pronouncement was contained in section four of the act. Until the time of the Civil War no question was raised as to the obligations of companies under land-grant charters excepting that concerning the transportation of mail. Considering the limited military establishment existing in the country at that time, little, if any, importance was attached to the "free from any toll" clause in the charters.

The war changed all this, however, and for the next several decades the obligations imposed upon land-grant railroads by their charters received serious consideration both in Congress and in the courts. The Illinois Central, as the largest and most important of the land-grant roads, was deeply concerned as to the interpretation which should be placed upon the "free from any toll" clause by the government.

Months of uncertainty ensued, during which time the road continued to provide transportation service for the military and naval forces without any assurance of reimbursement. Finally, an agreement was reached whereby the government claimed the right to use the company's roadway without compensation, but agreed to compensate the railroad for the use of its motive power, passenger and freight cars, and other facilities. The amount agreed upon was the normal rate allowed non-land-grant railroads for passenger and freight service, less 33⅓ percent said to be due the government for "charter" privileges.

The agreement reached between the United States government and the Illinois Central Railroad on August 15, 1861, was continued in force throughout the war. Except for numerous complaints on the part of the railroads and occasional efforts in Congress to bring about a more literal interpretation of the "free from any toll" clause, it remained as the guiding principle in the relationship between government and the land-grant railroads until all claims to land-grant rates were finally abandoned within the past decade.

The experience of the Civil War caused an entirely new estimate to be placed upon the value of railroads in modern warfare. The Illinois Central soon demonstrated its ability to serve the needs of the military forces in the West by taking the lead in the movement of troops, equipment, and supplies to Cairo for distribution farther south. Its main line, reaching the upper Mississippi at Dubuque, tapped the developing resources of the younger states of Iowa, Wisconsin, and Minnesota, while its 250-mile Chicago branch made contact with the important eastern rail lines, as well as with the vitally important Great Lakes traffic. In the words of William H. Osborn, wartime president of the Illinois Central, "The Illinois Central Railroad is second only to the Washington branch of the Baltimore and Ohio Railroad in relation to the military operations of the Government."

In view of its strategic location and the transportation demands which were made upon it, the Illinois Central was most fortunate in being spared the ravages of war upon its property and line, a circumstance not enjoyed by

certain of the important eastern lines, notably the Baltimore and Ohio and the Northern Central. As the tide of war moved south from Cairo the Illinois Central's southern terminus continued to be an important point of departure for men and materials required by the Union commanders in the field, and a concentration point for prisoners of war moved northward after successful military operations in the South.

Although the contribution of the Illinois Central to the military activity of the North deserves emphasis, it should be remembered that the company was also called upon to provide transportation service for civilian enterprises likewise quickened by the stimulus of war. Frequently, the road was taxed to the limit to meet the demands made upon it, and in situations where military and civilian activities were in competition for the road's facilities, it was the civilian activity which suffered.

Obstacles placed in the way of trade as a result of the closing of the Mississippi River struck a crippling blow at one of the road's major sources of revenue. The shift in the pattern of the export trade of the Northwest away from the Mississippi route and toward the Great Lakes-Erie Canal route accelerated a movement which had been gaining strength for a decade and more. The Illinois Central Railroad played a vital role in rerouting the commodities of the Ohio and Mississippi valleys after the southern route had been closed by the war.

Furthermore, the road found it necessary to undertake the duties of a grain merchant during 1861 and 1862 in order to protect its own position as the state's largest landholder and make

possible the marketing of a bumper corn crop. More than 3,000,000 bushels of corn and a much smaller quantity of wheat were accepted by the railroad at a figure slightly above market price in lieu of cash payments on company lands during these years. Naturally, local industry, agriculture in particular, felt the shortages of equipment as well as the uncertainties of freight service which were most acute during periods of intense military effort.

The superiority of the Illinois Central's Chicago line dates very clearly and unmistakably from the Civil War era. Even before 1861, the rapid development of Chicago as a center of trade and commerce had raised the branch to a position of near equality with the main line. The stoppage of the Mississippi trade and the routing of a major share of the Illinois grain crop to Chicago hastened the transition still further. By 1863, President Osborn stated publicly that the Chicago branch had become, in fact, "the main line of the road."

The experience of the Illinois Central during the Civil War was much like that of American railroads generally during the world conflicts of the twentieth century. Such difficulties as a shortage of equipment, an inadequate labor supply, rising costs, and maintenance difficulties in the face of an unprecedented traffic demand all combined to intensify the ordinary problems of railroad operation. Consequently, although rail earnings reached new heights during the war, expenses of labor, maintenance, and operation also increased at a rapid pace. Nevertheless, the Illinois Central became a consistent dividend-paying railroad for the first

time during the Civil War. Dividends, which had been meager before the war, rose to 4 percent in 1862, 6 percent in 1863, 8 percent in 1864, and reached the handsome figure of 10 percent in 1865.

Post-Civil-War Problems

The chief concerns of the company management as the postwar era opened centered around such problems as the difficulty of maintaining the traffic level at a point comparable with that of the war years, the necessity for reducing the expenses of railroad operation which had nearly trebled since 1861, and the imperativeness of acquiring feeder lines whose local business, would, in turn, swell the traffic total of the parent line. It was in connection with this last concern that the course and direction of future Illinois Central development was determined.

The postwar decision of the company to acquire connections beyond the borders of Illinois marked a definite break with the original policy of the road. Events of the previous years had convinced the management of the advisability of obtaining branch and feeder line railroads as the surest method of stimulating new business for the Illinois Central. The initial steps in the first out-of-state acquisition were taken while the war was still in progress. The Dubuque and Sioux City Railroad and its subsidiary, the Cedar Falls and Minnesota, offered a most satisfactory path for expansion into the promising states of Iowa and Minnesota. The details of consolidation were worked out during 1867, and on October 1 of that year the Illinois

Central took formal possession of the Dubuque and Sioux City Railroad.

That the Illinois Central had clearly embarked upon the highroad of intersectional expansion, by way of lease, merger, and consolidation, became perfectly evident in the early 1880's. In 1872 the Illinois Central had extended its influence 547 miles southward from the Ohio River to New Orleans by means of an agreement with the Mississippi Central and the New Orleans, Jackson and Great Northern roads. Soon these companies, along with several other pioneer railroads of the lower Mississippi Valley, were brought together in the Chicago, St. Louis and New Orleans Railroad Company, and the Illinois Central's lease of this latter company in 1883 extended its control all the way to New Orleans.

Until 1881 the interchange of passenger and freight cars was hindered at the Ohio River by the necessity for ferry service between Cairo and the Kentucky shore. An additional difficulty arose from the fact that the gauge of the lines north of the Ohio was 4 feet 8½ inches (today's standard gauge) while that of the lines south of the river was 5 feet. In a remarkable performance on July 29, 1881, the gauge of the entire line from East Cairo to New Orleans was converted in the course of a single day to standard gauge, thereby enabling both locomotives and cars to be exchanged freely between the northern and southern lines.

Equally noteworthy was the construction of an enormous bridge across the Ohio River at Cairo. Opened to traffic in 1889, the Ohio River bridge represented the last link in the long de-

velopment of the Lakes-to-Gulf rail route. The Illinois Central is at the present time engaged in a major project of rebuilding and repairing the bridge at Cairo. The improvements, which will require several years to complete, have been planned to interfere as little as possible with the normal flow of traffic over the bridge.

Through the years the present outline of today's Illinois Central map has been filled in by numerous mergers and consolidations accomplished both by the parent company and by its southern affiliate, the Chicago, St. Louis and New Orleans Company. Between 1880 and 1900, the mileage of the Illinois Central more than trebled, while the traffic and earnings increased in an even more spectacular manner. This span of years includes the long association of Stuyvesant Fish and Edward H. Harriman in the management of Illinois Central affairs, and represents for the company its period of greatest expansion and growth.

The pattern for twentieth century railroad development had clearly been set at the time of the death of Mr. Harriman in 1909, though problems of unbelievable intensity growing out of wars, periods of inflation, and depressions lay just ahead to complicate the transportation scene down to the present day.

The Railroad and Its Public

It would be unfair to assume that the Illinois Central has been completely free from public criticism during its long history. No company engaging in business of a public character and directly concerned with the public interest could be so fortunate.

Most of its difficulties during the nineteenth century grew out of either the unique arrangement prevailing between the Illinois Central and the state of Illinois, or the aroused state of the public mind distressed by the industrial transformation which followed the Civil War. This condition was still further inflamed by the prevalence of questionable corporate practices in an age of loose business morality.

In the former connection, tax difficulties and interpretations arising mainly from the charter provision that the railroad must pay 7 percent of its gross earnings into the treasury of the state held the spotlight, and were sharply reflected in the efforts of subsequent Illinois constitutional conventions (1862 and 1869) to prevent any relaxation of the obligations of the company under its 1851 charter. Thus it is that the present Constitution of Illinois contains the provision that "No contract, obligation or liability whatever, of the Illinois Central Railroad Company . . . shall ever be released, suspended, modified, altered, remitted, or in any manner diminished or impaired by legislative or other authority. . . ."

In the latter situation the "aroused state of the public mind," represented by the Granger Movement, centered its attack upon railroads generally and emphasized in particular the matter of rates and the discrimination evil. Illinois, one of the centers of Granger agitation, responded with a Railway and Warehouse Commission to regulate the rates and charges of railroads, grain elevators, and warehouses. The decision of the Supreme Court in the celebrated case of *Munn v. Illinois*

(1876) established the principle of the greater responsibility of a business clothed with the public interest and in so doing upheld the right of government to regulate all types of public transportation. The enactment of legislation in 1887 setting up the interstate Commerce Commission shifted the burden of regulation from the shoulders of the individual state to those of the Federal government. The various strengthenings of the I.C.C. have long since satisfied the demand for adequate Federal supervision of American transportation.

Additional difficulties which have been more or less common to American railroads over the past century occasionally produced friction between the Illinois Central Railroad and its workers, its patrons, and its neighbors. Included in this category would be problems raised by the upsurge of organized labor in the United States, the ever-present smoke nuisance, and the demand for the improvement of terminal facilities. The controversy which raged for years over the rights and privileges belonging to the Illinois Central, and the obligations and responsibilities owed by the company, as a result of permission granted by the city of Chicago for the railroad to enter the city along the lake front, proved to be one of the hardest to settle. After years of disagreement, litigation, and bitter recrimination, the lake-front controversy was ultimately settled to the satisfaction of the city, the state, the Federal government, and the railroad.

To point out that the Illinois Central has not always enjoyed the high level of public confidence which it possesses today is both to admit the

intensely human character of many of its early leaders in a day of great economic and social turmoil, and to credit the company with having made great strides in the direction of building better relations with its public. Begun shortly after World War I, the public relations program of the Illinois Central has been remarkably successful in its avowed intention of "taking the public into its confidence." Under the general supervision of George M. Crowson since 1925, the program has earned many compliments and much favorable comment for its fresh and constructive approach to a problem long neglected by American business. Sponsored and encouraged by its last three presidents, Markham, Downs, and Beven, and by the present head, Wayne A. Johnston, the Illinois Central has not only accomplished much

in the direction of maintaining friendly relations with its public, but has set a high standard of achievement in the realm of employee relations and company safety as well.

Over the broad sweep of a century, the Illinois Central Railroad stands today secure in its proud claim of being the "Main Line of Mid-America." Its own century of service coincides with an amazing century of national and continental development to which the railroad has contributed in such large measure. Whatever the demands that may be made upon American railroads in the uncertain future, we may be certain that the "Main Line of Mid-America" will continue to provide the same kind of safe, dependable, and efficient transportation for which it has been famous in the past.

Atomic Energy and Private Enterprise

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THE EMERGENCE of humanly controlled nuclear fission during the Second World War opened up a vast new source of energy that seemed to have as vast possibilities for peacetime use as it had already demonstrated for wartime use. That possibility also posed a series of grave questions about the part which the newly developed source of energy should play in the national economy. At the outset two questions emerged as of primary importance: What should be the respective roles of military and civilian activities? What should be the respective roles of private and public enterprise? These questions significantly influenced the Congressional policy that culminated in the Atomic Energy Act of 1946.¹

After some years of relative silence on the policy problems, there now appears to be a revival of interest and discussion in them. As yet neither discussion nor action has gone beyond the preliminary stages; but the renewed interest in the status of atomic energy raises the possibility that the policy laid down in the 1946 Act may be changed.

The purpose of this article is to examine the provisions of the Atomic Energy Act and the administration of this law by the Atomic Energy Commission, with special reference to the

role accorded private enterprise. In the light of this review of present practice, certain proposals which have been made for revision of the law will then be subjected to critical examination. Attention will be focused on the forces influencing the formation and execution of policies, and on the pressures instigating a change in these policies.

The most systematic discussion of the issues involved in the 1946 legislation may be found in the Report of the Senate Committee on Atomic Energy. That Committee noted potential peacetime benefits for medicine, biology, and other branches of research. Further developments in technology were necessary before power would become an important product. There were also large and significant international issues. Concern here, however, is with the policy fixed in the legislation with respect to private enterprise; the other aspects are not surveyed or at most are commented on only incidentally.

The statement of policy in the Act first delineates the general role of private activity. The Congress faced the future with humility and declared that it could not forecast with any certainty the consequences of atomic energy. In view of that large unknown, the needs of defense were made the first call on such energy. After those needs were met the policy was to be designed to improve the public welfare, to raise the standard of living, to strengthen free competition in private enterprise, and to promote world peace.

¹ The Congressional phase may be traced generally in the relevant committee reports: *H. Rpt. 1186*, 79 Cong. 1 Sess. (1945); *H. Rpt. 2478*, 79 Cong. 2 Sess. (1946); *H. Rpt. 2670*, 79 Cong. 2 Sess. (1946); and *S. Rpt. 1211*, 79 Cong. 2 Sess. (1946). The last is hereafter cited as merely *S. Rpt.*

The programs looking toward these ends were described as involving assistance to private research, the control and dissemination of scientific and technical information about industrial application in so far as that is consistent with safeguards against destructive purposes, the development of Federal programs of research, and finally "government control of the production, ownership, and the use of fissionable material to assure the common defense and security and to insure the broadest possible exploitation of the field."

The Senate Committee thus recommended public ownership of production, coupled with the broadest exploitation consistent with national defense requirements. That is the verbal formula embodied in the final legislation. The House of Representatives had favored public ownership but had been disposed to allow greater range to private activity, under license. The House had also proposed to give the military a greater recognition in the formal organization than was accorded in the final legislation. That legislation, however, did give the military access to those features of atomic energy which were important to their needs.

Public control and private enterprise intersect at several places in the operation of the policies of the Act. The following sections of this article will examine the more important of these areas, which include: ores, raw materials, and their processing; production of fissionable material; research and its applications; industrial potentialities of atomic energy; and patents.

Ores, Raw Materials, and Their Processing

To begin at the starting-point of the productive process, the Act defines "source materials" as including uranium, thorium, and any other material which the Commission, with Presidential approval, determines to be "peculiarly essential to the production of fissionable materials." In order to come under this definition ores must have concentrations to the degree fixed by regulations of the Commission. In short, if uranium or thorium present in certain materials does not possess the degree of concentration which the Commission fixes, such materials are not "source materials" within the terms of the statute.

After being mined, the source materials as thus determined may not be transferred from person to person without license from the Commission. The prohibition applies both to the transferor and the transferee. The Commission is empowered to make this section effective by rules and regulations requiring reporting of "ownership, possession, extraction, refining, shipment, or other handling." So long as the materials are left in the ground the Commission has no control. The legislation, in the Committee's words, does not extend "the principle of Government monopoly . . . to the ownership, mining or refining of source materials. Nevertheless the Committee recognizes the necessity of giving to the Commission the power to control supplies and transfers of source material by means of licensing procedures." It also states: "It is not the intent of the Committee to authorize the Commission to engage

in mining operations in competition with private mining activity unless such operations are necessary to insure the Commission a supply of source materials adequate for carrying out its duties and responsibilities. . . ." The Committee accepted the idea that the best way of increasing supplies of the ores was the maintenance of the "traditional rights and incentives" for prospectors, who were relieved of the necessity for reporting.²

The Commission has followed the views of the Committee almost literally. Its *Third Semiannual Report* says:

The Commission believes new reserves of source materials can best be developed by competitive private industry, under the stimulus of profits, and the means of accomplishing this are under study.

In general it will be Commission policy to purchase ores for its program from private sources and limit direct Government production as far as possible. It is desirable, however, for the Commission itself to carry on certain activities for the purpose of determining the most efficient methods of ore extraction and beneficiation. The Commission recently purchased the vanadium plant at Monticello, Utah, from the War Assets Administration and plans to put these facilities into operation after necessary repairs and alterations have been made and an ore stock pile has been accumulated. Consideration will be given to operating or encouraging the operation of other plants in the area.³

The Commission study resulted in the issuance of a series of regulations

for the control of raw materials. The regulations define raw material as any source material which has not been chemically processed and source materials that are to be found in residues or tailings of former mining operations. Source material is "any material, except fissionable material, which contains by weight one-twentieth of one percent (0.05%) or more of (1) uranium, (2) thorium, or (3) any combination thereof."

In order to stimulate private domestic activity, the Commission announced that it was guaranteeing for a ten-year period minimum prices for refined uranium, high-grade uranium ores, and mechanical concentrates. Second, it offered a bonus of \$10,000, recently increased to \$35,000, for the discovery and production of high-grade ores from new domestic deposits. Third, it guaranteed for three years prices for low-grade carnotite and roscoelite types of uranium-vanadium ores of the Colorado plateau area. Minor amendments to these regulations have been made from time to time.⁴ The Commission has aided such private activity in

² The text of the regulations may be found in the *Fifth Report*, Appendix 4. This report provides the most extensive discussion by the Commission in any of its reports. The others supplement this basic summary of policy. The *Sixth Report* contains a supplement to these regulations in Appendix 10. See also *Ninth Report*, Appendix 4. An account of the Commission's activities with regard to raw materials may be found in two articles by J. J. Katz, "Uranium exploration in the U. S.," 6 *Bulletin of the Atomic Scientists* 177 (June, 1950), "Uranium procurement policies," 6 *Ibid.*, 349 (Nov., 1950). This periodical will hereafter be cited as *BAS*. See also W. H. Bradley, "Occurrence of uranium deposits," 5 *BAS* 149 (May, 1950).

² *S. Rpt.*, pp. 18, 19.

³ P. 4 (January, 1948). These reports are numbered from the first report in January, 1947, and the second in July of the same year. Odd numbered reports indicate January reports; even numbers are for July reports. Hereafter they will be cited by number only. See also *S. Rpt.*, p. 15 for another statement of the role of private enterprise.

several ways. It has purchased and is operating two plants for the reduction of ores in order to assist small producers of raw materials. Also, in conjunction with the U. S. Geological Survey, it has expanded explorations for deposits containing such ores, and has provided free testing and assaying services.

From the outset the Commission has had to rely mainly on foreign sources, e. g., the Belgian Congo and Canada, for raw materials, and yet one consequence of its activity in the United States has been to expand the known quantity of raw materials available from domestic sources.⁵ Dependence on foreign sources poses serious problems in a potential future war because of the necessity for keeping the reactors operating without a break. Stockpiling of the materials is, of course, indicated in these circumstances.

The next stage of the raw material activity which has an important bearing on private enterprise is the licensing system. The sweeping character of this control is indicated in the words of the Regulation issued by the Commission:

No person may transfer or deliver, receive possession of or title to, or export from the United States, any source material after removal from its place of deposit in nature. This includes the disposition of raw source materials (including residues or tailings) by dumping into streams or sewers, or disposition in such other manner that recovery cannot be made.

Licenses are required to legalize such transfers. The Regulation grants exemptions from that requirement under two conditions: (a) if the monthly

amount of raw materials does not exceed 10 pounds; and (b) in the case of certain listed items.

The licenses utilized by the Commission in this control are of two kinds. A general license is granted to the following classes of persons without application: common or contract carriers, retail druggists or physicians, contractors of the Commission, and educational institutions. Other licenses are granted on individual application to the Commission. A license is required for any person who possesses more than 10 pounds of source materials or more than one pound of refined material. The Regulation adds that there is an obligation for all to report such possession to the Commission. Additional reports may also be required. Licenses are limited in time and may be renewed, modified, or revoked after proper procedure set out in the Regulation. They are not transferable.

The Commission has wielded its authority in the following ways:

Specifically prohibited is the use of uranium for decorative or non-productive purposes such as photography and the coloring of ceramics and glassware. About 3,500 pounds of uranium, as uranium oxide (U_3O_8) are licensed and consumed annually in the United States as a chemical reagent, in the manufacture of certain special glasses, in certain electrical equipment parts, and in research. Thorium compounds totaling 30,000 pounds, as in thorium oxide (ThO_2), are licensed each year for use in the manufacture of incandescent gas mantles within the United States. Other uses of thorium totaling 6,000 pounds, as ThO_2 , are for alloys, reagent chemicals, and research.⁶

⁵ *Third Report*, p. 3, and *Ninth Report*, p. 6. At present the Commission is investigating the possibility of raw materials becoming available in the gold mining areas of the Union of South Africa.

⁶ Incandescent mantles are important in many parts of the world for producing light from gas. Thorium is used in mantles, and licenses for its export in this form have been granted. (*Fifth Report*, p. 35.)

Limited quantities of both are licensed in conjunction with the export control office in the Department of Commerce for foreign use. In such cases there is careful investigation of the receiver.

In short, those private enterprisers who seek to operate in this area of activity face a market in which the Commission, as the sole purchaser of ores, sets the market price. Those enterprisers who function in the activities subsequent to the mining stage are subject to license on all phases of such activities. Some enterprisers, such as photographers, are denied access to the materials altogether and have had to find other ways of pursuing their business. These materials have a higher priority in common defense and security than in some of the earlier uses.

Production of Fissionable Materials

The next step on the route to atomic energy is the production of fissionable materials from the raw materials. The Statute makes this production a government monopoly by prohibiting private production. Private research activity is not permitted, unless in the Commission's judgment the rate of production is so small as to inhibit the production of an atomic bomb in a reasonable period of time. The Committee justified this principle on the following grounds: (1) the potential use of such materials for weapons; (2) the hazards to public health from radiation and the government's responsibility in the public health field; (3) possible international agreements; (4) the production of fissionable material is in its "infancy" and it would be "contrary to the principle of prudent stewardship" to allow private

operation; and finally (5) essential continuity of production is more likely to be achieved by government.

With this series of arguments operating against private operation, the Committee added,

Whenever possible, the Committee endeavors to reconcile Government monopoly of the production of fissionable material with our traditional free-enterprise system. Thus, the bill permits management contracts for the operation of Government-owned plants so as to gain the full advantage of the skill and experience of American industry. Industrial research in the field of atomic energy is left to private initiative, even where it relates to methods of production.⁷

The reconciliation, if such it be, is achieved by prohibiting private title in fissionable materials and allowing the Commission to license private possession. The Act defines fissionable material as plutonium, uranium enriched in the isotope 235, any other material which the Commission determines to be capable of releasing substantial quantities of energy through a nuclear chain reaction, and any material enriched by any of the preceding activities. In the exercise of the authority just granted, the Commission in 1948 declared Uranium 233 to be within its control.

The ban on private ownership also extends to facilities for the production of fissionable materials and to component parts thereof. In conformity with the policy of the Act the ban does not extend to facilities used for research on a very small scale. The Regulations list in some detail the specific items covered by this prohibition. Here also the Commission has designed two

⁷ *S. Rpt.*, p. 15.

types of licenses. A general license is granted without application for domestic production of certain kinds of facilities and only the reporting requirements are spelled out in the regulations. For other activities, including export, specific licenses are required and are granted on application. Any license is subject to revocation, suspension, or modification after proper proceedings. The regulations exempt from these requirements those operating such facilities for the Commission.

The *Second Semiannual Report* states in connection with these grants of security,

In the exercise of its regulatory functions, the Commission is impressed with the need of obtaining the advice of the groups whose activities are affected. In the drafting of the source material regulations, representatives of almost every group affected were consulted. As a result, their acceptance of the regulation has been prompt and wholehearted.⁹

The wide use of advisory committees in all ranges of the Commission's activity bears out this general philosophy of operation. In this way an undetermined amount of private influence penetrates to the detailed operations of this agency. Such administration, although not what is usually denominated private enterprise, is not inconsistent with the spirit of the Act.

Two further principles of the Atomic Energy Act need some comment before attention is directed to the further operations of the Commission. The Act makes the Commission the "exclusive producer of fissionable material" and in the statement of purposes makes the

common defense and security the primary goal of the Commission's activities. The Commission, in conjunction with the President, with the latter having the authority to decide, determines the extent of the emphasis on military applications. The Joint Committee has said that prior to the appearance of international controls for such energy "the most vital business of the AEC must be meeting the atomic requirements of national defense."⁹

The Commission in 1948 acknowledged that

The paramount objective of "assuring the common defense and security," as defined in the Atomic Energy Act, required a major program of development at the Los Alamos Scientific Laboratory, where the weapons program is concentrated. An over-all plan was completed during the year and a number of important steps taken towards its fulfillment, including the construction of service and technical facilities, improvement and standardization of design of weapon components, development work on new designs, and the beginning of an extensive program of stabilizing production operations.¹⁰

In 1950 the Commission observed that the weapons program had moved from a "laboratory to an industrial type of operation."¹¹ The Act prohibits private manufacture or production of atomic weapons, and the only way in which private enterprise can contribute to that area of activity is through research work which the Commission may authorize and approve. This area is, of course, mainly secret, and little is

⁹ Pp. 16-17. The administrative policies of the Commission towards private enterprise are discussed in detail later.

⁹ *First Report of the Joint Committee on Atomic Energy, H. Rpt. 1289*, 80 Cong. 2 Sess. (1948), p. 7.

¹⁰ *Third Report*, p. 1.

¹¹ *Seventh Report*, p. 9.

published about the developments. Newspapers and others may speculate about such activity, but employees are bound by security regulations.

A second principle of the Act that needs some attention, although it has had little impact, is found in the famous seventh section. Containing the usual exemption of research work, the section authorizes the Commission to license the manufacture of all devices for utilizing atomic energy; a corollary to that licensing requirement is the illegality of such manufacture without the license. The section goes on to lay out the procedural steps prior to the introduction of such devices. A report of the device must be made to the President; the report then goes to Congress for a minimum period of ninety days. If in that interval Congress takes no action, the Commission is empowered to grant nonexclusive licenses and to attach such conditions as will effectuate the purposes of the Act. In short, unless Congress elects to control the introduction of new devices, the Commission is to wield that control.

In the exercise of its licensing power the Commission is instructed to limit such licenses to one-year periods with possibility of renewal. The licenses are also revocable. More particularly the Act states:

Where activities under any license might serve to maintain or to foster the growth of monopoly, restraint of trade, unlawful competition, or other trade position inimical to the entry of new, freely competitive enterprises in the field, the Commission is authorized and directed to refuse to issue such license or to establish such conditions to prevent these results as the Commission, in consultation with the Attorney-General, may determine. The Commission shall report promptly to the Attorney-General any

information it may have with respect to any utilization of fissionable material or atomic energy which appears to have these results. No license may be given to any person for activities which are not under or within the jurisdiction of the United States or to any foreign government.

The restraints thereby imposed derived from the Committee's and Congress's concern about the future of atomic energy. The Report states that the Committee was "aware, nonetheless, that the sudden introduction of certain devices utilizing the power released by nuclear fission might precipitate profound economic disorganization. Great industrial installations representing nation-wide investments, employing many thousands of workers, might be rendered obsolete."¹²

Secrecy and monopoly as to military weapons is probably not so great a break with traditional methods of operation in the United States, although many of the major developments in weapons have come from private sources. The control of the introduction of new industrial methods is more unusual, although not unique in this country. Controls on television currently furnish a vivid example of such an instance. Utilities are commonly subject to control of entry. Recent agricultural legislation clearly tends in this direction although the specific question has not been presented for determination. Those who want to argue the novelty of this provision must not overlook the wide variety of experience that American industrial regulation presents.

The section, it has been noted, re-

¹² *Sen. Rpt.* 1211, p. 20. Health problems also play an important role in the matter.

quires nonexclusive licenses if any are granted. This points in the direction of the patent provisions of the Act. These will be briefly surveyed later. Finally, the seventh section authorizes the Commission to sell any energy that may be produced as a by-product of its activities. The sale may be to other government agencies, or to public or private utilities; if sold to the latter, the contract must contain provisions for "reasonable resale prices." That last requirement is similar to the one used for most water-power projects under the auspices of the United States. No developments beyond research have taken place.

Research and Its Applications

The Committee report that preceded the passage of the Atomic Energy Act made it abundantly clear that the greatest contributions of atomic energy were to be in the future. The peacetime benefits were expected to be in medicine, biology, and other branches of science. The Committee pointed out that atomic energy as a source of power awaits further research and development. The Act reflects this general theory, and the Commission is authorized to make loans, grants, and contracts for research by private and public institutions in the various phases of atomic energy. The Commission was also authorized to undertake research of its own in the same fields. The Act empowers the Commission to distribute atomic materials for research and indeed indicates a preference for that use of materials.

The *Second Report* of the AEC describes some of its policies in the research field. Its main objectives were

to reduce the current high cost of producing fissionable material; to develop special reactors or furnaces for such materials; to begin investigation into the power aspects of atomic energy; to advance fundamental knowledge; and to help in several research and training programs that would be of assistance in future activities.

The same report also pointed out that "the majority of the larger laboratories are owned by the Federal Government; others are owned by industrial concerns, universities, and other research institutions."¹³ The AEC has justified the maintenance of large laboratories in the hands of the national government "because it [the government] needs secrecy and big groups of scientists who will take orders, and big equipment." In more explicit terms the argument was that the laboratories would "make more and better weapons," "develop possible peacetime uses of atomic energy," and "develop such scientific strength in the country as is needed in the long run to support the other two."¹⁴

Despite the large role played by the government-owned laboratories, the Commission has consistently emphasized the importance of the other laboratories, and it has entered contracts for research at a large number of institutions.¹⁵ In 1947 its views were

¹³ P. 2. Pages 8-10 of the report outline the research and development policies previously described.

¹⁴ Henry D Smyth, "The role of the national laboratories in AE development," 6 *BAS* 5 (Jan., 1950).

¹⁵ *Second Report*, p. 3. "The Commission has more than 100 contractors, and these in turn have several hundred subcontractors." The Commission has devoted some of its reports to detailed accounts of these activi-

formulated in the following words: "Through such participation the recognized managerial skills and scientific and technical talents of many organizations are available to the enterprise. . . . None of the Commission's major production and research programs is carried on by direct Commission operation."¹⁶ The quoted statement on the importance of Federal Laboratories may indicate some shift in emphasis on the part of the Commission as to the role of nongovernmental laboratories; the latter, however, still play a significant role in the entire program, as an examination of any of the reports will indicate.

The isotope distribution program has been the major peacetime development of the Commission. The first shipments occurred in 1947, and by the end of 1950 some 15,000 shipments had been made, 40 percent of them in 1950.¹⁷ Isotopes are by-products of the manufacture of the atom bomb. These products have been sent to more than 300 laboratories and hospitals in this country and some have been shipped abroad. "But although by-products, isotopes are generally regarded as the most valuable new research tool since the invention of the microscope. If the development of atomic energy had produced nothing else, its cost would un-

doubtedly have been balanced within a few years by the gains in knowledge that the Nation is making with isotopes — gains that are already becoming tangible in medicine, chemistry, industry and agriculture."¹⁸

In this area of activity the Commission's great contribution has been the reduction in the prices of isotopes. The previously cited pamphlet of the Commission on *Isotopes* points out that one millicurie of C-14 now costs \$50, whereas the same amount if produced by the cyclotron would cost \$1 million. The wide variety of isotopes is also a new contribution. The policy of the Commission has been to "*make isotopes available to all qualified users in quantities as large as can be profitably used, in variety as great as can be developed, and at the lowest possible cost.*"¹⁹

Apart from the contractual relations with research institutions in which the Commission bears a portion of the costs of operation, it has also given financial assistance to private business concerns in stimulating them to develop selected isotope labeled compounds. The Commission's theory is that it should bear the development costs; thus the private industry is enabled to price the com-

ties. The *Seventh Report* deals with the physical sciences; the *Sixth Report* pays particular attention to medical research; and a general treatment of isotopes may be found in the *Fourth Report*. In 1948 the Commission issued a pamphlet entitled *Background Material on Activity in First Year of Distribution of Pile-produced Radio-isotopes*. Each semiannual report also has a section devoted to these areas.

¹⁶ *Second Report*, p. 3.

¹⁷ *Ninth Report*, p. 26.

¹⁸ *Third Report*, p. 7. That view is reiterated by Paul Aebersold, "Isotopes and their application to peacetime use of atomic energy," 4 *BAS* 151 (May, 1948). The following has been said about the medical aspects, "The last six years have seen the initiation of more profound changes in scientific medicine than any period since the discovery of bacteria or the invention of the microscope. . . ." Shields Warren, "The medical program of the AEC," 4 *BAS* 233 (Aug., 1948). Not the least interesting possibilities are the understanding of photosynthesis and chemical genetics.

¹⁹ *Third Report*, p. 7. Italics in original.

pounds without adding such costs to its prices. The Commission has expressed great hopes for further expansion of private activity in these areas.²⁰

The connection of private industry with isotopes extends beyond the research goals. The use of isotopes has stimulated a demand for new equipment, designs, and other items of operation, and there is a growing market for such services. In the Commission's view,

The supplying of these growing demands is a job for business. With the Commission furnishing the basic pile-produced isotopes required for the manufacture of radioactive compounds, private industry is in a position to provide all of the equipment, materials, and services needed by isotope tracer laboratories today. Already electronics firms have taken the lead in developing radiation detection instruments. Enterprising companies are beginning to offer prepared radioactive compounds. And some are thinking in terms of more complete services for research workers

The firms going into this field are looking beyond today's market, in which eight out of ten isotope research projects are concerned with basic science, fewer than one out of ten with industrial problems. Of course, the supplying of laboratories and hospitals can be a good-sized business in itself. But the potential applications of isotopes to the work of industry—for the control of processes, the testing of products, and the development of entirely new processes and products—is an open field of opportunity. It is the kind of field the American competitive industry is uniquely fitted to develop.²¹

²⁰ AEC, *Isotopes*, (1949) pp. 14, 28. In the *Fourth Report* the AEC says that each firm will set its prices "in accordance with normal industrial practices" (p. 37).

²¹ *Fourth Report*, pp. 35-36. It was further stated that already some thirty firms were engaged in supplying radiation detection instruments.

Industrial Potentialities

Probably the most exciting possibility arising from the development of controlled atomic energy is the use of the energy for the production of electric power. There are many other uses to which atomic energy may be put. At present all such potentialities are in the future. The Commission began some preliminary explorations in the field of electric power production and subsequently outlined an extensive development program. That program has now been pushed down into lower priorities and greater attention is being given to submarine propulsion as well as air propulsion by means of atomic energy. These areas are subject to secrecy for national defense reasons, but some things are clear. The heavy weight of a reactor because of the shielding requirements, the cooling problems, and the capacity of materials to contain the radioactive substances present great obstacles to any early solutions.

The possibilities of atomic energy in other industries have stimulated some speculation, but at present there seems to be no clear understanding of the prospects. There is a vast amount of literature on the questions involved. All of it is highly speculative in its content. Some of the general conclusions may be summarized here. David E. Lilienthal, while he was still Commissioner, said in one address, "There is as yet no firm basis for estimating the competitive cost position of useful power from nuclear sources with respect to the cost of generating power from conventional fuels."²²

²² Text in 3 *BAS* 339-40 (Nov., 1947). It seems fair to say that that observation

The literature discusses other potential uses, e. g., for air and rocket propulsion, and for uses in engineering and in other industries. The conclusions are rather vague at the present time.²³ It may be noted that a Technical Advisory Board was created in 1950 as a "working group to accelerate the development of nuclear power for aircraft."²⁴ In December, 1950, the President also asked the Congress to provide additional appropriations for the Commission. The Congress responded to the request favorably. Over \$1 billion was provided for work on weapons and fuel for power-producing reactors.²⁵ These developments accompanied a slowdown in activities that are primarily related to civilian and peacetime uses.

still stands. See Philip Sporn, "Prospects in industrial application of atomic energy," 6 *BAS* 303 (Oct., 1950). See Sam H. Schurr, and Jacob Marschak (eds.) *Economic Aspects of Atomic Power* (Princeton, N. J., 1950), *passim*. A bibliography on nuclear fission as a source of power may be found in 4 *BAS* 115 (April, 1948).

²³ Laurence R. Hafstad, "Atomic power for aircraft," 5 *BAS* 309, (Nov., 1949) and Dr. Luis W. Alvarez on the same topic in *Atomic Information*, March 20, 1947, pp. 7-8. Also F. Reines, "Are there peaceful engineering uses of atomic explosives?" 6 *BAS* 171 (June, 1950); Sam H. Schurr, "Atomic power in selected industries," 5 *BAS* 30 (November, 1949). The latter is summarized from an article in *Harvard Business Review* for July, 1949. See Schurr and Marschak, *op. cit.*, *passim*.

²⁴ *Eighth Report*, p. 169. The same report indicates that higher priorities have been given to military uses over future civilian uses. See pp. 167, 168.

²⁵ See the *Ninth Report* for a summary of the President's request. This report also describes briefly the projected developments on the Savannah River in South Carolina and the project near Paducah, Kentucky.

Patents

A major development in national policy is to be found in the patent provisions of the Atomic Energy Act. No effort will be made here to deal with this policy in any great detail. Suffice it to say that patents are not to be granted on those inventions or discoveries which are "solely useful" in the production of fissionable materials. Patents of other types may be declared by the Commission to be affected with a public interest and subject to its control for compulsory licensing. Procedures are laid out for determination of reasonable royalties and other questions.²⁶ Developments have not gone far enough to indicate what the policies will be.

Administrative Policies

The operations of the Atomic Energy Commission extend through forty-one of the forty-eight states, with 1,270 locations throughout the world. The Commission occupies more territory than is included within the state of Rhode Island. It has 1,000 contractors and subcontractors, and its activity "directly conditions the lives of 200,000 people, including employees and their dependents." The Commission spends a billion dollars a year. Such was the summary of the AEC's activities in the Joint Committee's report which followed the investigation of Senator

²⁶ See the discussion in the Committee Report. See also *Fifth Report*, and Bennett Boskey, "Inventions and the atom," 50 *Columbia Law Review* 433 (April, 1950); R. W. V., "Atomic energy patent provisions and the American economy," 97 *U. of Penn. Law Review* 389 (February, 1949).

Hickenlooper's charges of "incredible mismanagement."²⁷

In its *Ninth Report*, the Commission says, "This program, probably more than any other in the United States Government today, is carried on through contracts with private industry rather than by direct Government operation."²⁸ In the Commission's language,

The major programs are research and development in private and government-owned institutions to promote progress in atomic energy; production, use and Government control of fissionable materials, which, under the President's direction, includes the production of atomic weapons; control and dissemination of scientific and technical information; and a program of administration consistent with the policies established by the Act. The enterprise is owned by the people of the United States and its operation is directed toward the paramount objective of assuring the common defense and security, and beyond that, toward obtaining for the people the many constructive benefits that atomic energy offers.²⁹

In the view of the Commission its "most important administrative decision" was to continue the system of contracting that it had inherited from the Manhattan Engineering District. Under that system the Commission enters into contracts with industrial concerns and academic institutions "to perform the actual operations." That original decision has been reviewed by the Commission from time to time and

in every instance the same conclusion has been reached.³⁰

Under the favored method of operation the Commission enters into contracts with various organizations to perform the work which is deemed desirable. Its staff then supervises the activities of its contractors. This contracting system covers the operation of the Commission's laboratories, the management of the production facilities for fissionable materials, and even the governing of the towns that have grown up around Oak Ridge, Tennessee, Hanford, Washington, and Los Alamos, New Mexico. These may be described, though not altogether accurately, as company towns.

The contract system includes two main types: (a) fixed-price contracts, under which the Commission pays a lump sum for a construction job, or for processing ores, and in some other instances where the type is deemed feasible; (b) cost-reimbursement contracts, under which the Commission agrees to pay the costs of the operation and perhaps a fixed fee which is agreed upon between the contractor and the Commission. These contracts are entered in one of three ways: (1) The contract is awarded to the lowest bidder after public advertisement—the usual manner of letting government contracts; (2) the Commission may select firms which, in its judgment, are qualified to perform the proposed un-

²⁷ *S. Rpt. 1169*, 80th Cong. 2d Sess. (1949), p. 86. The dissenting views are in part II of the same Report but they do not challenge the majority findings to any serious degree.

²⁸ *Ninth Report*, p. vii.

²⁹ *Ibid.*, p. 39.

³⁰ *Ninth Report*, p. 39. See also *Second Report*, p. 5. A fairly complete description of the system of operation may be found in Hearings of the Joint Committee on Atomic Energy, 81 Cong. 1 Sess. February 17, 21, 24, 1949. See also *S. Rpt. 1169*, pt. I, pp. 18 et seq. 81 Cong. 1 Sess.

dertaking; these firms are then invited to submit bids, and the Commission lets the contract to the lowest bidder; (3) a firm is selected by the Commission by whatever criteria are deemed relevant and the firm and the Commission negotiate the contract.³¹ On some contracts the fixed fee is nominal.

This contracting system has occasionally generated some skepticism on the part of Congressional committees. In one instance the comment was made:

You are using a device that is unknown to Government procedure before the Army instituted it during the war. Now, however, you are carrying it on. Here is a contractor with so many employees and you are calling them contractor's employees when in truth and in fact the Government pays every penny of their salaries and it pays the contractor, in addition, a fee for managerial services.³²

³¹ *Ninth Report*, section on contract system. This report provides a description of the method of operation. The appendixes reprint the regulations governing operations thereunder. It may be noted that these operations of the Commission run counter to activities of other branches of the national government — e. g., the Commission selected duPont to construct the plant on the Savannah River when the Anti-trust Division has proceedings pending against the firm in some of its activities. The same is true of General Electric. The Commission needs the great attainments of these firms in the highly technical areas of operation.

³² *Independent Offices Appropriation Bill for 1950*. Hearings, Subcommittee on Appropriations, House of Representatives, 81 Cong. 1 Sess. part I. p. 1094. The succeeding pages report a colloquy on the merits of the contractor system. Towards the end of the discussion the following remarks occur:

Mr. Thomas (Chairman of the Subcommittee). "Your statement means this: You made greater progress under private industry, even though private industry's position in the matter is somewhat nominal; and the second is that private industry is

In the concurrent Senate Appropriations Subcommittee hearings the AEC reiterated its view that the contractor's employees were not its employees and that it did not pay any salaries to such employees. The contracting system was defended on the ground that other agencies were also using it. In general support of its position the Associate General Counsel of the Commission pointed out that the contractor's employees were not subject to the Taft-Hartley provision prohibiting strikes by government employees.³³

The payment of fees to contractors in addition to the costs of the operations has been justified by the Commission.

Our basic policy in paying a fee to an operating contractor who has no investment of his own in the program is that we want to get know-how from him; we want to take from his regular organization key people who could make him a profit in his regular line of business, in order to get our base costs down. . . .

If he has such people and if we do get from him and get them into the business of knocking down our base costs, then we believe that private concern rates some

doing the job cheaper than the same job could be done in the civil service and in the Government. Is that what it amounts to? Is that what your statement means?"

Mr. Lilienthal (AEC). "I think it is just that the whole point is that private industry is far and away at this juncture the best place for this to be done. Whether it is cheaper in dollars per unit or per year, I think it would be awfully hard to prove, but it is a lot safer and we will make more progress in process improvement — because these things are now in the early stages — through utilizing private corporations than we will through direct government employment," *ibid.*, p. 1097. See also *H. Rpt. 1618*, 80 Cong. 2 Sess. (1948).

³³ *Independent Offices Appropriation Bill for 1950*, Hearings before the Senate Subcommittee, 81 Cong. 1 Sess., pp. 572-75.

compensation for the profit they are not able to get by engaging those key people in their own lines of operations.³⁴

A more generalized defense of the Commission's method of operation through the contracting system is presented in the *Ninth Report*. The advantages are there indicated to be that: (1) "... it lays the groundwork for eventual termination of Government monopoly and the integration of atomic energy development with the competitive private enterprise system"; (2) the government takes advantage of the managerial skills of industry;³⁵

³⁴ *Independent Office Appropriations Bill for 1951*, Hearings before Subcommittee, House of Representatives, 81 Cong. 2 Sess. pt. 6, pp. 2157, 2158. A table of the fees paid is printed in *Independent Offices Appropriation Bill for 1950*, Hearings, Senate Subcommittee on Appropriations, 81 Cong. 1 Sess., pp. 10-11.

³⁵ The following remarks from the Hearings on the *Independent Offices Appropriation Bill for 1950*, pp. 1095 *et seq.*, are relevant.

Mr. Lilienthal. "Now let us take the Carbide and Carbon Corporation at Oak Ridge as an example in response to your question. Item 1 is that the operations of the diffusion plant at Oak Ridge are characteristically an industrial operation. There is a lot of industrial background and skill that this country can draw on only through existing industrial corporations. . . .

"I would not take the responsibility for 10 minutes in respect to the diffusion plant, as a member of this Commission, if it were not in the hands of an experienced industrial contractor. That operation is unknown to industry, but it may not stop for a split second.

Mr. Thomas. "If it is unknown to industry, how do these people know so much about it?"

Mr. Lilienthal. "They are the people in the country who know best about it.

Mr. Thomas. "I thought you said that was unknown to industry. Could you not hire those people just like you are hiring them now? Then you will not be hiring a corporation, but you will hire the same

and (3) industry gains the advantage of knowledge about atomic energy. This last item, however, raises another problem. The Act imposes a duty to promote competitive industry, but only a few firms out of all American industry are ever likely to participate in contracts with the Commission. The policy of the Commission is to try to offset

individuals that the corporations are hiring. Let us get down to the fact that the corporation is paying them a little bit larger salary than you are able to pay them under the law."

Mr. Wilson (AEC). "In the upper brackets some of the salaries are higher." [Otherwise the testimony showed the situations were "certainly comparable in most cases."]

[Following a colloquy as to whether government could attract men as well as private industry, the issue was resumed.]

Mr. Lilienthal. "Mr. Chairman, I have no reason to believe that a good deal of what is now being done may not in the future be done more cheaply and as well by very able men on a force-account system. For example, take the operation of the town of Los Alamos or at Hanford. There was a good deal of normal or conventional construction there. I think it would be awfully risky at this juncture to change from a successful industrial type of organization which are getting the benefit of —."

Mr. Thomas. "How do you mean that? Where is the risk? Do you mean that from a security point of view?"

Mr. Lilienthal. "No sir. In the first place, I mean it from the sheer continuity of operation. Now, at Oak Ridge or at Hanford, these operations must not be allowed to stop even momentarily, or even be allowed to be interrupted. So, to take the risk of changing from one type of operation to the other seems to me a thing we ought to avoid.

"The second point is that while in time what you say may well prove to be the case after we get further along in the development stage — although I am favorably disposed to the idea of direct Government employees doing certain things, and my TVA experience was one of those things, nevertheless I think in the case of a new process. . . ."

that special advantage by deliberately bringing new firms into contract with itself and further to place a "fair share of contracts and subcontracts" with small business.³⁶

One special feature of the contracting system merits further notice. The towns that are sites of major atomic plants are in areas owned by the national government, and the Commission has assumed the obligation to keep the communities operating. The Commission has done this by contracting with private firms for managing these cities. The ordinary controls which local citizens exercise over their communities do not exist. The Commission has not been happy with the problems thereby presented. The *Eighth Report* describes in some detail the manner of operation and concludes,

The Commission's experience demonstrates that there are formidable problems to be solved before the towns can be transformed into normal American communities. For the Government to attempt to withdraw from community operation hastily might jeopardize the whole atomic energy program by producing chaotic communities during the period of transformation.³⁷

The contracting system for community operation enables the contractor to control privately owned enterprises that perform the usual services for the

residents of a community. The contracting firms by making regulations can control entry into business. Since space is ordinarily limited it is not possible to resort to the first come, first served principle that operates in most communities. The limited space also modifies the use of the competitive principle in bidding for the opportunity to undertake business activity, for then it would be a monopoly, or at best an oligopoly, with price regulation or public ownership and operation as an alternative. It is precisely the last situation that present policy seeks to avoid. The Joint Committee, after the investigation in 1949, was persuaded of the genuineness of the Commission's desire to rid itself of these community problems, although it found that more energy could have been put into that effort. Nevertheless, the Committee concluded that the Commission's decision to retain control was "dictated by necessity."³⁸

The same Committee apparently approved the contracting system which the Commission uses in other areas of operation, although that approval is not explicitly stated. The Committee noted that the Commission had inherited and was continuing the method of operation which the Manhattan Engineering District had used. The Chairman of the Commission's Industry Advisory Committee is said to have "testified that a contractor system is sound and that it draws upon native manufacturing genius more effectively than any other method of operation." This vague approval of the method of operation did not blind the Committee

³⁶ *Ninth Report*, p. 40. It is there mentioned that private industry is now engaged in producing the following for profit: compounds containing radioisotopes, instruments for detecting radiation, mining, milling, and processing ores, and preparing uranium for use in production plants.

³⁷ *Eighth Report*, p. 176. See also Lyman S. Moore, "Democratic local government in the AEC communities," 7 *BAS* 19 (Jan., 1951).

³⁸ *S. Rpt. 1169*, pt. I, p. 86.

to some less effective phases of the total operations.³⁹

Proposals for Revision

By far the greatest controversy about the McMahon Act and its administration since 1946 has been concerned with the relative roles public and private enterprise should play in the development of atomic energy. The Act has been called "the socialist island" and America's "most radical law."⁴⁰ The Committee that wrote the Act tried explicitly to reconcile several contradictory goals and requirements: civilian control with military needs; free information with national security; development of the new resource with adequate controls; and, most difficult of all, public ownership with private enterprise.⁴¹

In order to achieve such conflicting goals it was necessary that the legisla-

³⁹ *Ibid.*, pp. 18, 18-20. The latter pages discuss the large overrun at Hanford by General Electric and the slowness of the Commission in discovering the incident. An estimated cost of \$6 millions wound up as 25 millions. There were some extenuating circumstances.

⁴⁰ James R. Newman and Byron S. Miller, "The Socialist Island," 5 *BAS* 13 (January, 1949); James R. Newman "America's Most Radical Law," *Harper's* (May, 1947). These pieces are variations on the theme presented in their book *The Control of Atomic Energy* (New York: Whittlesey House, 1948). For a criticism of the premises of such views see A. P. Lerner, "Does control of atomic energy involve a controlled economy?" 5 *BAS* 15 (January, 1949).

⁴¹ The civilian-military issues had made little news in the intervening years. There are allegations that a fight developed in 1948 and that the civilians won. See the issue of the *BAS* for September, 1948, pp. 260, 267. Cf. Karl Cohen "A re-examination of the McMahon Act," 4 *BAS* 7, and Edward Teller "The first year of AEC," *Ibid.* (January, 1948).

tion authorize a public agency to make a number of decisions which otherwise might have been left in private hands. As one writer has said, "As it stands now, the Commission bears the onus of deciding the role of private enterprise. And that decision will have to be made in accordance with the prevailing pressures of the day."⁴²

In recent months there have been some indications that the policy of the Act is not accepted as sacrosanct. Probably the strongest statement in support of the Act that has appeared since the Committee Report in 1946 is to be found in Commissioner Lilienthal's address "Private Industry and the Public Atom" which he gave before the New England Council in November, 1948. In that speech he reiterated the identical arguments which the Committee had advanced in support of the Act. He alluded to the departure from the traditional private enterprise principle and then remarked that the item in the way of the use of that principle "... is not ideology or doctrine but facts—the facts about nuclear reaction which no arguments about ideology will change. . . ." The "facts" were the arguments which the Committee had presented for the policy of the Act. Even this speech carried undertones of the defensive attitude of the Commission toward the principle of public ownership.⁴³

The "pressures of the day" in 1946 came out strongly in support of civilian public ownership and control. The con-

⁴² Richard D. McCann, "Atomic controls: the domestic dilemma," 4 *BAS* 11 (January, 1948).

⁴³ The speech is reprinted in 5 *BAS* 6 (January, 1949).

trary pressures may be said to have been victorious in the actual operations of the Commission. Even a cursory reading of the various reports of the Commission will impress the reader with the great importance which the Commission attaches to the role of private enterprise.

The policy embodied in the Act was not challenged in the political campaign of 1948.⁴⁴ Some criticisms of the operations of the Commission have been made by the Appropriations subcommittees of the Houses of Congress. None of these, however, went so far as to challenge the theory of the legislation. The Joint Committee has been given special duties in connection with atomic energy, and it has not yet challenged the Act; even the extensive investigation that followed Senator Hickel's charges in 1949 did not reach that point.

So far as Congress is concerned there has been no attack on the theory of the Act. There have been some attacks by private persons. The Industrial Advisory Committee appointed by the Commission was critical of some operations of the Commission, notably contending that its information services could be improved and that a more vigorous effort should be made to interest private business in its activities. Suggestions by this section of the public have so far merely recommended closer association with industry.⁴⁵

⁴⁴ The relevant materials are collected in the *BAS*. Dewey made a vague speech. Truman answered it. The Republicans omitted atomic energy from their platform. There is a communication relating to that fact in 4 *BAS* 234 (August, 1948). The speeches may be found in 4 *BAS* 296 (Sept., 1948) and 4 *BAS* 336 (Nov., 1948).

⁴⁵ *Report of the AEC Industrial Advisory*

Suggested Changes of Present Law

Several articles have been pointedly aimed at revising the theory of the McMahon Act. The first of these postulated that the legislation was based on two great virtues: (1) the integration of domestic and international control; and (2) the transfer of atomic control to civilians. The author then observed that since international control is no longer a probability the first virtue has disappeared. Moreover, he did not find that the transfer from the military had been completely successful. On examination it was discovered that the opposition to military control was really based on the weaknesses of centralized as against decentralized administration. Manifestly the Commission had retained centralized administration and control; consequently, in so far as the basis of the Act was to avoid that kind of administration it was unsuccessful. An additional objection of a secondary character was found in the commercial exploitation of atomic energy by the government. The author thought that, to meet this line of criticism, the Act should be revised to separate domestic from international policy. International policy should be activated through export controls. The Act should retain "legitimate" govern-

Group. The Commission has printed the Report. It is summarized almost completely in 5 *BAS* 51-55 (February, 1949). See also Lilienthal's letter commenting on the Report in the same issue; and Philip Sporn, "How can private industry best participate in the development of atomic energy?" 7 *BAS* 48 (February, 1951). The *Ninth Report* mentions the interest of private industry in nuclear reactors and "welcomed the proposals to study problems." Recently such steps have been taken. (*N. Y. Times*, April 5, 1951, p. 41.)

mental and "military objectives." Private industry should be free to participate on its own initiative and patent controls should be removed.⁴⁶

The second article to suggest a revision of the legislative policy proposed a new administrative apparatus to wield authority over atomic energy. The proposal rested on three principles: (1) the government monopoly over materials and production should be eliminated but security controls should be retained; (2) competition should be enforced; (3) the patent sections should be repealed and the patent law revised to meet the problems of secrecy.⁴⁷ The main objective seemed to be reform of the patent provisions, which make serious inroads into the usual rights of patentability and patent owners.

The latest recruit to the point of view that the Act needs substantial revision is the former chairman, David E. Lilienthal. In a series of two articles he has advocated major policy revisions.⁴⁸ The range of his attack is

⁴⁶ Karl Cohen, "A Re-examination of the McMahon Act," 4 *BAS* 7 (January, 1948).

⁴⁷ Walter DeCew "New legislation to replace the McMahon Act." The article first appeared in *Nucleonics* (July, 1948). It is reprinted in 4 *BAS* 277 (September, 1948). The latter journal prints a piece by Edward Levi, "Shall the Atomic Energy Act be revised?" in the same issue. Professor Levi found no basis for changing the legislation on the grounds presented. He also rejected the failure of international control as a basis for changing the domestic policy.

⁴⁸ Two articles in *Collier's*, June 17, 1950, and July 15, 1950. The earlier article "Free the atom" urges the desirability of competition. The substance of his argument may be summed up in his words "The people and corporations [now operating the projects] are good but the results are not. They are not up to American par because the job is not being done the American way."

broad. In the first place, he denies that the total secrecy policy, with its accompanying declassification procedures, is necessary. All that is needed is secrecy for weapons. The proposals which he makes go to the core of the Act. Although Lilienthal does not advocate the giving up of government ownership, he does recommend that the plants be leased to the private concerns now operating them, and that in conjunction therewith competition be encouraged among the leaseholders. Moreover, other private concerns should be free to build their own reactors. In particular, reactors should be developed in Utah for work on the phosphate ores; in Detroit, Cleveland, or Chicago for work on metals; and in St. Louis for work in the chemical industry. In his view these steps would require a change in statutory declaration of policy. The new declaration should favor competition and allow profits to those who succeed. The section providing for public control over the introduction of new industrial activity through atomic energy should be repealed, as well as the patent sections, so as to permit private decisions to determine the rate and scale of change.

These policy changes would mean almost complete reversal of present Congressional policy. Lilienthal argues that the secrecy feature is overplayed and that it is likely to hinder more than it helps. He argues that tax laws ought to make allowances for experimentation in atomic activity and that if his proposed changes were adopted private industry would be stimulated to invest; thereby greater general benefits would accrue than are likely to be at-

tained under present governmental development. He has no fear but that adequate controls can be imposed for health purposes and that weapons may be assured primacy in development.

These views of Lilienthal have been challenged. Others have argued on the same side in the secrecy issue, although Congress has shown little sympathy with relaxation of present controls.⁴⁹ The other proposals have been examined by Byron S. Miller and rejected, for the most part. Miller found little difference between the proposed lease system and the present contractual system. The present statute does not prevent industrial access to production processes, and the Commission has ample authority to permit such access. In fact, it has invited some investigation by industry. The Commission is currently subsidizing private research in atomic energy. Turning next to the proposals concerning reactors, Miller doubted that industry could recoup the capital costs from potential income, and anyway the Commission is now furnishing all the facilities and can continue to do so. If private industry were to take over, the present prices of isotopes for research

would have to be substantially increased.

The major premise of Lilienthal's case rests on the anticipation that electric power will soon be produced from atomic energy; Miller, on the contrary, doubts that power production is close. The urgency of policy change is therefore undetermined. Miller advances other points. In the first place, he doubts the likelihood of there being enough atomic fuel for both private power and weapons in the near future. As a consequence the private firms would be faced with a difficult situation in that their fuel could be requisitioned for weapons and their source of electric power would be thus removed. Conventional means of producing power, therefore, would still have to be maintained. Capital investment would be greater than for conventional means. The financial risks would continue to be severe, and a change in the present policy would have to gamble on the prospect that private industry would undertake them. In order to encourage private industry, revision of the patent sections would have to be the major inducement. Further, Miller doubts that patent repeal would be enough, and he thinks that even if it were enough the price of the change would be too great.⁵⁰

The critics of the legislation are apparently pressing in the direction of greater freedom for private decisions. The premise of the reasoning is that greater results for "general welfare" will be achieved by changes in legisla-

⁴⁹ There has been some criticism by Congress of data in the *Reports* of the Commission. On the general issues, see Herbert S. Marks, "Congress and the Atom," 5 *BAS* 44 (February, 1949). The article is based on the same author's article in the *Stanford Law Review* (November, 1948). See Anne W. Marks, "Washington Notes," in 5 *BAS* 158 (May, 1949) and similar articles in subsequent numbers. See also "Atomic Energy Report to Congress," Hearing before the Joint Committee on Atomic Energy, 81 Cong. 1 Sess. Feb. 2, 1949; *S. Rept. 1169*, 80 Cong. 2 Sess. (1949), for an excellent discussion of the problems of principle.

⁵⁰ Byron S. Miller "Easing controls over industrial development—a comment on the Lilienthal proposals," 6 *BAS* 279 (Aug.-Sept., 1950).

tion which opens avenues to individual decision. One former Commissioner has now come out on that side. Another Commissioner has provided a thoughtful commentary on developments in the first four years of the Commission's functioning. Some notion of the present status can be gleaned from his observations.⁵¹

In Commissioner Waymack's opinion, national security has been strengthened and the Commission has done very well in that respect. He concedes that serious difficulties have developed and still exist in policy on the dissemination of information, but nonetheless he thinks that some "balance" has been attained and civilian control has been achieved. It is equally clear that relations with the Joint Committee have been unsatisfactory, and that as a result the main instrument of public control is not all that could be desired. He considers that the management of the undertaking has on the whole been successful and that private enterprise is playing a larger part. In his own words he concludes,

Probably as much has been done as could be done. Fruits may be greater as time passes. Indeed, the substantially broadened base of industrial participation indicates this. But if the expectation was that small industry could be strengthened relative to big industry, I fear that was largely illusion. The reasons lie in factors that are pretty inexorable. Certainly in the early stages only giants have been capable of undertaking the really big tasks.

Conclusions

The preceding account is an examination of policy making by the national

government. A strenuous debate in 1946 was resolved by the decision that the national government should have a monopoly in the development of atomic technology. Five years later private business had gained a predominant role in the operation of atomic facilities, under the general supervision of the Atomic Energy Commission. The debate over the soundness of the policy embodied in the 1946 legislation is still going on. That discussion concerns the main principles of that Act and not its details. The process of policy making is still actively under way.

The administrative agency which was given the main responsibility to carry out the Congressional mandate has developed a policy which deviates from the apparent intent of the basic law. The AEC now boasts of the administrative decisions which implement the status of private enterprise, and the Congress has not taken any steps to indicate displeasure with these developments. That fact is indicative of the pressure exerted by those groups which have initiated the debate to revise the policy of the legislation. The Commission has utilized its discretion to move in the same direction.

These developments are not surprising to close students of the policy-making process. It has taken more than a century and a half to fix the present public policy towards the postal services. In that century and a half there have been a number of serious controversies over the role of the government. Currently there are two controversies at the national level; one, the rate on second class mail, is being actively discussed. The other, which is pursuing a quieter course, relates to the policy

⁵¹ W. W. Waymack, "Four years under law," 7 *BAS* 51 (February, 1951).

of competition with the Railway Express Agency. It would be easy to stimulate agitation over other issues in this area if prospective changes were likely to have any degree of success.

The present policy towards telegraphic communication also has undergone a number of changes since the national government gave the first money to promote its development over a century ago. In the course of that century there have been several efforts to make that service a part of the postal service, but each of these efforts has petered out in the policy-making struggle. The last of these was during President Wilson's administration. Of course there have been developments in policy since that time, notably in the Communications Act of 1934 and the amendments to that Act in 1943.

It is safe to say that the end of policy making in nuclear fission is not at hand. The greatest technological innovations are still in the future, and the struggle over the distribution of the "spoils" of those innovations also lies in the future. The decision about those re-

wards or "spoils" may be made by Congress or by the Commission. In either case, there will be extreme efforts made to route the gains in one or another direction. It is clear that private enterprise has gained tactically in these preliminary skirmishes, since it now occupies an important place in the developments. That place can be weakened and even destroyed by other pressures. Only the future can tell the outcome.

Any forecast is subject to all the frailties of human capacity to delineate the future. It is certainly not irrelevant to recall that the whole problem of public policy here under survey emerged from a great combination of military and business interests in the Manhattan Engineering District. The possibility of those groups combining again should surely not be overlooked. So long as international tensions play a major role in policy anent the new source of technology, it would seem a good surmise that such a combination may again achieve the dominating position.

Helicopters and Convertaplanes

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PRESENT INDICATIONS point to the convertible plane to meet the needs of the aviation world today. In essence what is needed is an aircraft that will combine the vertical lift of the helicopter and the speed and load-carrying capacity of the airplane, and, at the same time, be safe, stable, maneuverable, and mechanically sound. Such a plane should fly both fast and slow, and land and take off in a space no larger than a tennis court; yet be simple in design and cheap in original cost and in operation.

The convertaplane is the result of dissatisfaction with the successive modes of air travel. After man invented the balloon, he found means to guide it. When the airship became too large and unwieldy to handle economically he turned to the airplane. It, however, could not land and take off from small landing places, so he invented the helicopter. But hitherto the helicopter has proved too slow to suit the air traveler and too expensive for him to buy.

The restless search for an aircraft that will not only fly fast but also land in a small area has led to the convertaplane idea—an aircraft which converts from an airplane to a helicopter, and vice versa. A successful convertaplane would have additional advantages. With a rotor-like apparatus to take the craft up in the air, the lift from the wings would not be necessary for landings and take-offs. Therefore, it is possible that wings might be shorter and thinner with correspond-

ingly less drag for high-speed flight. Since the rotors do not need to be in operation for long periods of time, it is possible also that jet power plants can be used for rotor power. Thus the carrying of the large amounts of fuel demanded by jet propulsion would be unnecessary.

Among the designers who are working on convertaplane problems are E. Burke Wilford, Antoine Gazoa, Gerald P. Herrick, Lawrence Le Page, Louis de Mohge, Lloyd Leonard, and Arthur Young. With engineers such as these attacking the problems, progress is bound to be rapid and substantial.

There are two basic types of convertaplane. The rotor axis on those of the first type remains vertical in forward flight as on the conventional helicopter. The rotor axis on those of the second type swings so that the rotor blades can act like the ordinary airplane propeller.

A number of possible designs may be found in the first kind. After the take-off in the normal helicopter manner, the rotor blades may become fixed wings, or be locked in a trailing position, or be withdrawn into the rotor hub. The latter operation is accomplished by telescoping the rotor blades in the same manner as collapsing some metal drinking cups. In all the proposed aircraft of this type there is a propeller for forward movement. The Gyrodyne described later is of this general category.

At present, the second type seems to hold the better immediate possibilities.

There are several methods proposed for changing the rotor to a horizontal position for forward flight. In one, the rotor and body of the aircraft swing together from the vertical to the horizontal, while at the same time the rotor blades increase in pitch and reduce in speed. The blades become a fixed wing and the tip jets which power the rotor furnish forward momentum. In another type only the rotors shift from the vertical to the horizontal, and vice versa.

Some designers are proposing twin rotors mounted on the wing tips, with the fixed wings taking on the craft load as the rotor axes are rotated. Other proposals include using rotor blades on a conventional fixed-wing area, and tilting the wings and rotors simultaneously so that when acting as a helicopter the wings are actually at right angles to the fuselage.

Only recently has interest revived in the convertaplane, but since 1918 some research on rotating wing aircraft has been done, primarily by the National Advisory Committee for Aeronautics and the military services. Previous to World War II the autogyro was a step in the direction of a convertaplane. It, however, was overshadowed by the development of the helicopter. Currently the development of a successful convertaplane is thought to depend only on sufficient research and adequate funds.

At the present time a full-size model of the British Gyrodyne, which approaches the true convertible aircraft, is already flying and arousing much interest. The Gyrodyne Company of America has proposed a convertaplane with a universally mounted tail rotor

that will provide both torque compensation and forward propulsion. This becomes possible because the main rotor is used for lift only. Cruising speed is expected to be from 50 to 75 per cent greater than that of equivalent helicopters, since the Gyrodyne is expected to fly with less drag than the conventional helicopter. The tail rotor can be turned from the 90-degree hovering position to one of about 14 degrees from the longitudinal axis aft. In operation, as the transition from hovering to forward flight takes place, the tail rotor turns aft, its pitch increases, and it absorbs the power being released by the decreasing pitch of the main rotor blades. When carrying three persons, a cruising speed of 155 miles per hour is expected.

The great interest in the convertaplane now shown by the armed forces is a logical result of two facts: (1) the rapid technical advance of the helicopter since 1937; and (2) its unexpected utility in the Korean War. The two facts are interrelated, since the development of the helicopter has been and is being aided by the military research and development programs.

The action in Korea is very different from that in some past wars, so that the use of the helicopter there has been dramatic as well as of great military value. The lifesaving activities of the helicopters have won them the affectionate nickname of "gyrating angels." At the start of the Korean action the original mission of the 3rd Rescue Squadron was changed because the rescue work was so important. When that squadron was first assigned to Korea, its mission was to act as taxicabs for the field commanders. How-

ever, the dramatic evacuation of a wounded soldier from the front lines so impressed Major General Partridge that he forthwith cancelled the original mission of the helicopters and assigned them to rescue activities.

The Marines in Korea soon found that helicopters were of great value in the tactical deployment of combat troops, and they lost no time in extending the activities of their helicopter force, which was intended originally for observation work. Like the ground forces, they, too, use helicopters to deliver mail, supplies, food, plasma, water, and ammunition, as well as for protective reconnaissance and patrol work.

Two new experimental Marine assault transport helicopters, recently ordered from McDonnell and Sikorsky, are expected to be larger single-rotor craft and better suited for combat work than anything produced up to this time. It is understood that the McDonnell craft will have a three-bladed jet-propelled rotor which follows the line of development that the St. Louis manufacturer helped pioneer with the Little Henry ram-jet helicopter (Air Force XH-20). Informed sources indicate that the McDonnell development will be a "Buck Rogers" craft of radical design.

Sikorsky's new machine will be more conventional in design, it is believed, and will be essentially a larger development of the ten-place S-55 which has already been ordered by the Navy as an off-the-shelf Marine transport.

The ideal requirement for an assault transport helicopter is that it will carry, besides its crew, a complete unit of fighting men with their equipment, such as a 12-man or a 16-man platoon

capable of fighting as a unit. Such a requirement, if met in the new machines, would provide a distinct advantage for assault troops using the craft.

That the Sikorsky machine will carry a considerably greater load than the S-55 is indicated by the fact that it will have a five-blade main rotor. The additional rotor blade area is a means of putting a greater load on the rotor without increasing the rotor disc diameter beyond the dimensions for an operation on shipboard. Since the three-blade rotor of the S-55 is powered by a 600-horsepower Pratt and Whitney Wasp engine, the power plant of the new machine will obviously be considerably more powerful in order to accommodate the additional load, probably in the 1,000-horsepower class or beyond.

Within the past few months the world's first practical low-cost helicopter has been unveiled by Hiller Helicopters. This new two-passenger helicopter, small and ruggedly constructed, may be stored in an average-sized garage without folding the main rotor blades. The Hiller-Hornet will be available in both enclosed cabin and open utility models and will be priced commercially at less than \$5,000.

The Hiller-Hornet is the essence of simplicity. It has only two hand controls. A simplified collective pitch stick for vertical ascent and descent is so designed and located as to control the craft directionally through movement in a horizontal plane. Cyclic control of the Hiller-Hornet's all-metal blades is obtained by use of an overhead stick and the Hiller patented "rotomatic" control. No foot pedals are required.

Also, there are fewer instruments on its panels than in the average automobile.

It is powered by two tip-mounted ram jet power plants developed by Hiller—engines which do not have a single moving part. Entire disassembly of the twin jet engines may be accomplished in a matter of minutes with no other tool than a screw driver. Unlike many jet aircraft, the Hiller-Hornet's sound range compares favorably with that of the conventional-powered helicopter.

Eleven years ago Stanley Hiller, Jr., set out to design and manufacture the lowest-cost, easiest-to-fly, and simplest-to-maintain helicopter. In 1948 the first real milestone was passed with the commercial certification of the Hiller 360, a three-place helicopter priced far below the nearest competitor. Now, after conducting an extensive jet development program for more than two years, Hiller's research group has produced the Hiller-Hornet.

Original plans calling for the commercial marketing of the Hiller-Hornet in the spring of 1951 were necessarily postponed when the present international situation caused a change in defense plans. All current Hiller production is now converted to the military, but the Hiller-Hornet is expected to be made available for the civilian market as soon as the national defense program permits.

During the past two years research and development have proceeded at a rapid rate with practically the entire helicopter industry working on war contracts. In addition to the helicopter developments previously mentioned, the Bell Aircraft Corporation has pro-

duced the first helicopter specifically designed for antisubmarine warfare. It features an engine of 240-horsepower for take-off, a double rotor, folding blades, stabilizing fins, and a quadruple landing gear.

The Piasecki Helicopter Corporation "Transporter" is called the world's largest transport helicopter. It is comparable in size to the DC-4 transport and is designed to carry approximately forty passengers. A detachable capsule beneath the fuselage doubles the payload in "truck-trailer" operation. Piasecki also has a seven-place military utility helicopter which is the first production helicopter equipped with an automatic pilot.

From the standpoint of the helicopter industry everything points to the greatest year ever for the nine or ten producers. It is estimated that there are currently at least 600 military helicopters of various types on order for 1951 delivery at a cost of about \$150 million. Production during 1952 will probably be even greater. Two interesting points may be noted in passing: almost all types of helicopters now on order are easily adaptable to commercial uses, and there is more uniformity in the Services' requirements for helicopters than for most of the other equipment which they buy.

Things to come in the field of convertible planes and helicopters are hard to predict. However, it is safe to say that the coming year will see a continued development of rotor aircraft for mail routes and for passenger shuttle service. Also, instrument flight of helicopters will be improved, jet propulsion will be refined, rotor blades will be developed further, and a true convertaplane may fly.

How Effective Is Prefab Advertising?

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JUDGING by a research study recently completed at the University of Illinois, perhaps it is too effective! In fact, this study showed that, if anything, prefab promotional material is overselling the product.

It all started when the authors began questioning consumers in an effort to find out what they know about prefabs. To obtain the information, a part-judgment and part-probability sample¹ was taken of 448 families in Champaign-Urbana, Illinois; this sample included residents of prefab, standard, and apartment houses. A down-to-earth approach was used to get at the consumers' attitude toward prefab literature as well as to find out how much they know about prefabs themselves. The information gathered on the sales effectiveness of the advertising material may be surprising to many people — let's see why.

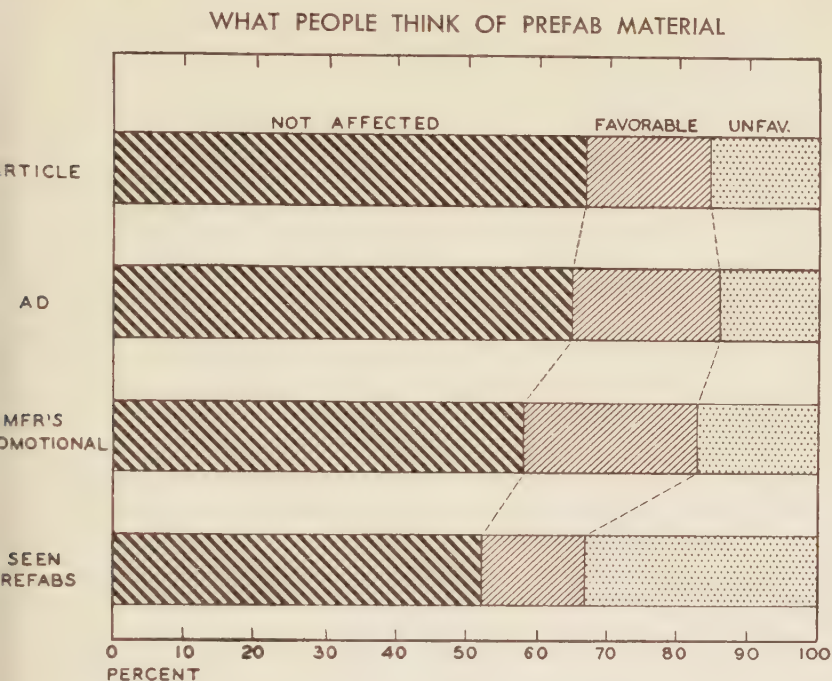
First, how widespread is the notice of written and other material dealing with prefabs? Almost one fourth of those interviewed could not recall having seen or read anything about prefab homes. Of those who did notice some-

thing, most (48 percent) mentioned articles, 42 percent remembered having seen advertisements, and 20 percent had read manufacturers' promotional literature. (The totals do not add to 100 percent, because many reported seeing more than one type of item.) Nearly 75 percent had seen prefabs, which is not surprising in an area where nearly one house out of every fifteen is a prefab. Considering the facts that about 45 percent of Champaign-Urbana families own their homes and that only a small fraction are likely to be interested in acquiring a house at any one time, these readership percentages probably indicate that the literature is successfully attracting consumer attention.

Breakdowns of prefab readership reveal some interesting information on what kind of people notice this material. For one thing, the little woman is either being overlooked or is just not interested in prefabs. Only one husband out of every ten failed to notice prefab material in some shape or form as against one out of every six of the married women. Readership among single people is, not surprisingly, a good deal lower.

Occupational differences show up, too. Readership is highest among the clerical-sales and professional-proprietor groups, and lowest among laborers. Income differences are espe-

¹ In a judgment sample, the selection of the respondents is left to the discretion of the interviewers. In a probability sample, the respondents are selected in advance from the population being studied in such a manner that each member, or family unit, in the population has an equal chance of being picked in the sample.



cially striking. Only one person out of every seven earning \$4,200 or more failed to notice anything about prefabs, but in the lower-income brackets — those earning under \$2,600 — this ratio rose to nearly one out of every three. In other words, whether or not the manufacturers intended it, acquaintanceship with prefabs is greatest in the higher-income brackets.

Reading something is not always believing. Therefore, of particular interest to advertising men is Mr. and Mrs. Consumer's reaction to the different types of prefab notices, shown in the accompanying chart. Articles and, sad to say, ads are most likely to have no effect at all on consumers, though they are effective in evoking a favorable response from 20 percent of their readership. Promotional material tends to

produce a still more favorable reaction though, considering that this material generally goes to consumers who are definitely interested in prefabs, the only surprising thing is that the reaction is not even more favorable. In fact, however, promotional literature seems to make an unfavorable impression at least as often as articles or ads.

But the one really striking point about this chart is the high percentage of unfavorable impressions reported by those seeing prefabs. Over one-third of the consumers who had seen prefabs walked away with an unfavorable impression! This compares with 13 percent in the case of ads and 14 percent for promotional literature. Another 50 percent of those who had seen prefabs were unimpressed either way. Why? Further probing revealed a variety of

reasons, mainly objections about construction, appearance, and size.

Can it be that advertisers are overselling prefabs? Additional research would be required to establish the true reason, but this seems to be a very plausible explanation. In other words, Joe Smith, who is in the market for a house and really interested in prefabs, may be "hepped up" a good deal by ads and promotional literature on all the wonderful virtues of prefabs. But when he gets around to seeing one, what he has brought himself to expect and what he sees don't jibe. Result — a disgruntled customer.

If this is the situation, what is the solution? Clearly, a better correspondence between the ad and the product. And since improvement of a product such as this is generally a long-run proposition, the situation would seem to call for a more realistic approach at the advertising end. The ads might try to give Joe Smith a better idea of what he can expect, and also, perhaps, some idea of what he should not expect. Such a policy may not raise the popularity of the ads, but it may prove very effective in promoting sales and, especially, in reducing the number of potential customers disillusioned by the product.

Another explanation is the possibility that the promotional literature may be following the wrong slant. What may be needed is to show the consumer that he is getting a better house in a prefab than he could get by spending

the same amount of money for a standard house. This is a subject that might bear investigation.

A toning down of the ads to appeal more to the middle- and lower-income groups is called for in any event. Pronounced differences were found in the reactions of various occupational and income groups to both the ads and the promotional literature. Favorable impressions are most frequent among members of families whose heads are in clerical, sales, professional, or proprietary jobs, least frequent among laborers' families. In the latter group, unfavorable reactions are twice as frequent as favorable ones (30% unfavorable, 14% favorable). That differences by income level also exist will probably not surprise anyone — no need to say in which direction.

This is the picture in one locality. Admittedly, the area is not typical of the rest of the nation, because the presence of the University of Illinois in Champaign-Urbana gives the twin-city area a high level of income and education, not to mention the relatively small amount of heavy industry. Although it is hard to say what effect the latter might have on the results of such a survey, there seems to be little doubt that the income-education factor tends to bias the sample in favor of prefabs. In any event, if the picture elsewhere is anything like the state of affairs in Champaign-Urbana, prefab manufacturers and advertisers may want to reconsider their promotional activities.

The United States and the International Trade Fair

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IN THE SUMMER of 1950 Chicago gained the distinction of being the first city in the United States to hold an international trade fair. Though new to the United States, such a fair is not an unfamiliar idea to the Western world, or to the Western hemisphere.

The trade fair, although of recent origin,¹ has its antecedents in ancient and medieval times, and it is similar in some aspects to the "world fairs" of more recent years that have been held from time to time in many large cities in the United States. Then, too, it resembles the special, industrial, or technical exhibitions such as the widely-known British Industries Fair, and the International Industrial Exposition held in Atlantic City in 1948.

Leipzig's International Trade Fair — the seven-centuries old "Leipziger Messe" — is considered to be the first international sample fair, displaying samples of goods. This Leipzig exposition, originally a merchants' fair, became a fair by and for wholesalers and producers. For years, though no more than ten percent of the exhibitors were foreign, Leipzig held the honor of being the only fair of its kind until other industrial fairs made their appearance in the twentieth century. Businessmen in cities like Lyons, Milan,

Brussels, Utrecht, Paris, and Vienna set up fairs of their own.

By the 1920's international industrial fairs had become such a part of the European economic scene that their organizers² formed a Union of International Fairs. The purpose of the Union was to coordinate the activities of the multitude of fairs and give them a common spokesman. Since 1926 the Union has held periodic congresses.

The 1930's, despite unstable economic conditions throughout all Europe, witnessed the continued growth of these fairs as they became more and more international in outlook and scope. Although the outbreak of World War II prohibited the holding of the trade fairs, people directly concerned with their promotion continued their work. With the cessation of hostilities international trade fairs were once more held in Europe.

United States Participation

American businessmen have participated in European trade fairs by sending samples of their products for display both before and since World War II. Each postwar year has seen an increase in the number of United States firms sending samples of their workmanship for foreign trade fair exhibition. In 1950, there were 1,408 firms that sent products to six important trade fairs, compared with 1,217 in

¹ There is controversy as to whether the modern international trade fair has any precedents in past history. It has been said that the medieval trading fair was a merchants' fair; the present-day trade fair is a producers' and wholesalers' fair.

² In 1950, fair organizers represented about 90,000 firms.

1949; this number represented a 15 percent increase.

Various groups in the United States have considered the possibility of holding on this continent international sample fairs patterned after the European fairs. At several Pan-American Congresses it has been suggested that the United States should hold an annual trade fair displaying samples of goods of the Pan-American countries. The city of Miami, Florida, for many years asked — without success — that the United States government help in constructing a Pan-American Exposition Building and International Mart where samples of the products made by the members of the Pan-American Union might be shown.

Though the holding of a sample fair by the Pan-American Union participants would have made such an exposition regional, the idea of a truly international sample fair to be held in the United States on a world-wide participation basis was not without its adherents.

An abortive attempt to hold an international trade fair in New York City in 1936 was pushed by an organization called the World Two-Way Trade Fair, Incorporated. Though the city did not hold such a fair either in 1936 or in 1937, as planned, New Yorkers have not entirely dropped the idea. The lack of sufficient building space has been the main reason for the procrastination.

Canada, in 1946, decided to hold an experimental international trade fair at Toronto. In the preparation stages the United States Department of Commerce collaborated with the Canadian Government Exhibition Commission.

So successful was the Fair, held at Toronto, May 31-June 12, 1948, that the Canadians decided to make it an annual event.³ At the opening of the Second Canadian International Trade Fair, Charles Sawyer, United States Secretary of Commerce, was asked to officiate. On that occasion he said, "The people of Canada have created something new in the Americas," and expressed a keen interest in the trade fair as a device for furthering international relations.

In January, 1947, the Department of Commerce set up in the Office of International Trade a Fairs and Exhibitions Branch. In order to find out whether trade fairs would be feasible in the United States, the head of that Branch went to Europe to study at first hand the European trade fairs. At the October, 1948, General Assembly of the Union of International Trade Fairs, held at Milan, Italy, a delegate of the United States government participated as an observer.

At Paris in April, 1949, when a special committee of the Organization for European Economic Cooperation was considering sending to the United States a traveling caravan to display the products of the member countries, a representative of the U. S. Department of Commerce suggested that he believed a better and less expensive device for displaying these goods would be an international trade fair to be held somewhere in the United States. The idea was approved by the OEEC, as its members readily saw such a plan would be one more step toward the

³The fourth Canadian International Trade Fair was held at Toronto, May 28-June 8, 1951.

fulfillment of the aims of the European Recovery Program and would reinforce the efforts of the western European countries to increase their exports to the United States, and in turn to increase their dollar holdings.

Several large cities, including New York, Detroit, Atlantic City, and Philadelphia, were considered as possible sites where the fair might be held. However, a small group of Chicago businessmen headed by I. S. Anoff, President of the Chicago Convention Bureau, offered the facilities of the city of Chicago, which were promptly accepted.

The Chicago International Trade Fair

The Chicago businessmen formed a nonprofit Illinois corporation, The First United States International Trade Fair, Inc., to operate through private business subscription. The businessmen then began to formulate their plans. However, early in the preparation stages, the fair officers were faced with a number of obstacles. Though Chicago was available as a site, it was soon discovered by Mr. Anoff and his associates that the holding of a fair in 1950 had only "a fighting chance because of the shortage of time, because of the difficulties of tremendous distances, because of the unfamiliarity of Americans in the concept of world trade fairs, [and] because of the lack of people experienced in world trade fairs in the United States."⁴

As a consequence, the Fair was re-organized in January, 1950, with offices established in the Merchandise Mart in

Chicago. Complete advertising and public relations programs were mapped out in Europe and the United States. Offices were set up in New York, Washington, and Atlantic City, and sales representatives were appointed in other cities. Foreign offices were established in London, Paris, Zurich, Buenos Aires, and Montreal.

In the meantime the Council of the Organization for European Economic Cooperation, meeting in Paris, passed a resolution setting up a special trade fair board to assist member countries in planning a well-organized representation of their products in America. Several of the countries themselves appointed committees to help their businessmen. Dr. Jacques Kunstenaar, the head of the Fairs and Exhibitions Branch, Office of International Trade, Department of Commerce, was given leave of absence to accept the position as Executive Director of Foreign Affairs for the Chicago Fair. He immediately went to Europe to inform the people there of the importance of the Fair to their own export trade and economic stability.

Adlai E. Stevenson, Governor of the State of Illinois, through the United States Department of State, sent out invitations to all countries having diplomatic relations with the United States to participate in the Chicago International Trade Fair, August 7-20, 1950.

To facilitate the entrance of goods into the United States for exhibition at the Chicago International Trade Fair, the Congress passed a joint resolution which permitted goods that were to be displayed to be admitted through

⁴ I. S. Anoff, "How Chicago Prepared for Fair Outlined" in *Chicago Journal of Commerce*, July 31, 1950.

Customs without payment of tariff until the goods were sold.

Approximately 1,500 exhibitors from 46 countries and the United States displayed their goods. Eighty-five percent of the exhibitors were foreign firms, and 80 percent of the space was occupied by foreign products.⁵ There were about 25,000 buyers present and the Fair was attended by more than 265,000 persons. Sales made directly at the Fair totaled \$20,000,000.

The exhibits were arranged in 13 commodity groups, with a large classification of goods in each group. Consumer goods took up about 60 percent of the allotted space and capital goods, 34 percent; travel, tourist, and service companies obtained the remaining 6 percent.

Perhaps the greatest interest on the part of both wholesalers and producers was shown in Group I, which included apparel and accessories, footwear, and jewelry and gifts; and in Group X, special industrial machinery, general industrial machinery and equipment, electrical goods and supplies, machine tools and metalworking equipment, as well as laboratory, scientific and engineering instruments, equipment and supplies.

A large number of products new to the American market were on display for the first time. Among the new products exhibited was a revolutionary made-in-Holland piano that has the string length of a 6-foot grand, but requires only the floor space of a spinet-type piano. Austria introduced the world's smallest pipe organ. A new

type of sewing machine made by a German manufacturer was demonstrated. This sewing machine sewed on buttons, made button holes, embroidered, and did zigzag operations without any attachments — all this was done with the flick of a "magic dial."

From Germany came a sturdy portable canvas-wood canoe called a Klepper Kyack. It can easily be folded into a knapsack. A British company introduced a new type of nonslip floor cream complete with a \$300 accident insurance policy. Another British company displayed an electric fireplace heater that gives off the glow and flicker of a wood-burning open fireplace. Swiss manufacturers exhibited a novel fabric called "Turitex" that was guaranteed "to be boil proof, impervious to sunlight, perspiration, sea water, and chlorine." The Swiss also showed a new type of watch with a unique dual winding action, winding both clockwise and counterclockwise.

At the Chicago International Trade Fair the ECA nations had a special section, called the Hall of Nations, where each of them had information booths and where prospective buyers could obtain information about government controls — currency regulations, tariff regulations, and the like.

Future of International Trade Fairs in the United States

So successful was the First United States International Trade Fair that Chicago made plans to hold a second international trade fair in 1951 toward the close of the summer season. However, it was decided to postpone the Fair until the spring of 1952 — March 22-April 6 — because it was found that

⁵ It is believed that foreign participation at this Fair was greater than at any previous international trade fair.

the Korean war and the resulting mobilization program would make it impossible to hold such an event earlier. Then, too, there was a definite preference on the part of buyers for an early spring or early summer date.

The Chicago trade fair organization has officers abroad once more to interest European countries in the Fair and to explain the advantages to them of sending samples of their goods to display at Chicago. It is felt that European producers and manufacturers can help fill in America's gaps in production, as a number of American producers have converted to wartime production, thus curtailing the supply of goods available for the civilian population. It is hoped that the Second International Trade Fair will be larger than its predecessor, with a greater number of exhibitors and a wider variety of products being displayed.

The success of the First Chicago International Trade Fair was further evidenced by the fact that New York and Detroit were planning to hold international trade fairs in 1951; but because of unsettled "world conditions" they have decided to postpone their expositions. However, it seems safe to say that once world conditions return to normal, the cities of the United States will hold a series of world trade fairs. Pressure for holding trade fairs will apparently come both from American buyers—especially if high levels of demand are sustained—and from foreign producers, whose countries are hungry for dollars, so that they can continue to buy heavily from United States producers.

A grand circuit tour of fairs will result, with the leading cities in the

United States holding these fairs. As one city concludes its trade fair, another city will hold its fair, in much the same way as one succeeds another in the cities of Europe. It is not expected that all the trade fairs will display the same goods or that all the same manufacturers, wholesale buyers, and businessmen will be represented at each. This variation in participants—both buyers and exhibitors—should further promote increased sales of goods and services of the participating countries, thus helping to increase world trade.⁶

World Trade Fairs and World Trade

The First International Trade Fair at Chicago had as its motto: "World Trade, World Prosperity, World Peace." International trade fairs, which display and sell goods and services, do their part to further world trade by

⁶ An import service that is closely related to the trade fair principle is the Permanent Exhibitions for International Trade, Inc. (PEIT)—an organization, or import service center, that was to begin operations in New York City, June 1, 1951, and is to be housed in a 12-story building. Later, PEIT hopes to set up similar centers in three other cities—one on the West Coast; one in the Middle West; and one in the South. The types of foreign goods to be displayed will be specialty goods that are noncompetitive with American products. All such foreign goods will be carefully screened by the U. S. Marketing Council.

PEIT will perform services both for the foreign producer and for the American retail buyer. The organization will give technical assistance to the foreign producer so that his goods can be adapted to the American market, especially in regard to packaging, designing, merchandising, and advertising; and by PEIT's vast advertising the organization will introduce these goods to the American buyer who buys in great quantities, especially to the retail buyer.

broadening markets and making more and more people aware of new products.

Last year (1950) our imports of goods and services were valued at \$12,150 million and our exports of goods and services amounted to \$14,350 million. How much of this trade was due to the holding of the first United States trade fair and our participation in international trade fairs cannot, of course, be ascertained. Although part of the increased demand for foreign goods and services is traceable to the Korean episode and to devaluation, part is attributable to United States civilians' increased buying of foreign goods and services, with trade fairs playing their part.

The participation of foreign nations in world trade fairs in the United

States provides an impetus and an opportunity for the countries of the world to earn much-needed dollars, and to help reduce world dependence on United States aid. United States buyers at European trade fairs⁷ also help the countries to sell their goods in the United States, as these buyers recognize the demand in this country for foreign goods and services. These fairs, with United States participation, can do their part to help re-establish multi-lateral trading among the nations of the world, and thus to increase world trade, making for world prosperity, and in turn, world peace.

⁷ According to a release of ECA, four American trade advisors of the U. S. Department of Commerce were present at the recent British Industries Fair (April 30-May 11, 1951) to answer questions of British businessmen on problems relating to selling in the American market.

Preferences of a Small Town Motion Picture Audience

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THIS ARTICLE presents the results of a study undertaken primarily to investigate the degree of success achieved by small town motion picture theater in meeting the needs of diverse population elements within the community. A secondary purpose was to explore the possibility of determining meaningful indexes for motion picture preferences as related to sex, age, education, marital status, and so forth.

A small Illinois community with a population of about 3,000 was selected for this study. Of primary concern in choosing the location was the need for an independent community that was neither a suburb nor a political unit contiguous in its boundaries to another political entity. An equally important condition was that the town contain a single motion picture theater, open daily, and presenting advertising as well as entertainment films. In Illinois, 328 of a total of 974 motion picture theaters are single theaters in small communities.

Secondary considerations were that the community should be located within a reasonable distance — less than an hour of travel time — of other places offering competitive motion picture entertainment, since patronage of out-of-town theaters may possibly be an expression of dissatisfaction with the local theater or theater fare; and that the community selected should have a fairly representative population, namely, a population not unduly in-

fluenced by a preponderance of any one minority racial or religious group.

Significance of Small Town Motion Picture Theater

The significance of the small town motion picture theater has heretofore never been thoroughly explored, because of the relatively minor contribution the smaller theaters make to the total income of the motion picture industry. However, from the viewpoint of the patrons of these small town theaters, motion pictures represent the most widely used entertainment medium available to them.

Despite the greater dependence of the small towns on the motion picture theater for entertainment, physical facilities there are generally less adequate than those of theaters in larger communities. The national average of motion picture seats per capita in 1948 was one seat for every twelve Americans. The average in cities of over 100,000 population was one for nine inhabitants. Thus, although specific data are not available in regard to small town theaters that are the sole motion picture exhibitors in their communities, it would appear that motion picture facilities are significantly inferior in the small town, both quantitatively and qualitatively.

Trends in recent years indicate that the small town theater may soon become a more decisive factor in the domestic market, the influx of tele-

vision transmitters in urban areas being the compelling force. In August, 1948, a National Broadcasting Company spokesman estimated that a half-million TV sets were in the hands of the public. By August, 1950, NBC estimated the number of TV sets in use at 7,000,000. Despite cutbacks in production brought about by the rearmament program, the number of sets in use at the end of 1950 has been estimated at 9,000,000.

A recent report on television by the Department of Commerce says, "A review of the locations of existing television stations . . . and of existing television chains, reveals that the television coverage for 1949-51 will be a metropolitan coverage with little, if any, rural coverage."¹

The effect of this concentration has been reflected in sharply curtailed box-office receipts in metropolitan theaters. In 1940, motion picture producers could count on recouping production costs from domestic consumption for five of every ten feature pictures. By 1948 this ratio had declined to one of every ten feature films. At the same time, the foreign market for American films was seriously reduced by dollar shortages abroad and a revived European film industry.

The net result of this pinching of two formerly lucrative markets has been to focus attention on the small town theater. A special committee of the Council of Motion Picture Organizations (COMPO) is currently engaged in designing a questionnaire intended to provide factual data, which

may, in turn, become the foundation from which further research is projected. It is hoped that the study herein reported may prove helpful in framing this questionnaire.

Method of Survey

In this study, a modified questionnaire technique was employed. That is, questionnaire forms were prepared which were personally distributed among the adult² residents of ninety dwelling units in the community, constituting a random sample of 8 percent of the total number of dwelling units. This personal distribution of forms was intended to serve a double purpose. On the one hand, it was hoped that by this means a greater interest in the project could be stimulated and the proportion of returns be thus increased. On the other hand, it was felt that a brief oral explanation of the meaning of several of the questions would make the answers more significant.³

In all, 279 persons over the age of 15 were reached by this survey. Usable replies were received from 86 of these persons. This sample thus represented slightly more than 30 percent of those to whom questionnaires were given and 2.6 percent of the entire population of the community. Although a return of 30 percent of the questionnaires

² For the purpose of this study an adult was defined as an individual who was free from parental authority in selecting the motion picture fare for which he paid admission. Previous questioning had established the age of fifteen as adult in this respect.

³ The use of the interview method was considered, but the fact that the time available for both the respondents and the interviewer was limited made that method inexpedient.

¹ Philip A. Bennett, *Television as an Advertising Medium* (undated), U. S. Department of Commerce, p. 3.

Table 1. Average Number of Times Respondents Had Attended Motion Picture Theater, by Selected Groups

Group	Number of respondents	Local theater	Out-of-town theater	Group	Number of respondents	Local theater	Out-of-town theater
Sex:				Education:			
Male.....	42	3.1	0.8	Some grammar.....	18	2.0	0.2
Female.....	44	3.2	0.4	Grammar graduate....	15	3.8	2.0
Age:				Some high school.....	18	3.8	0.4
15-20.....	16	6.8	1.1	High school graduate..	21	3.1	0.4
21-25.....	12	5.1	1.1	Some college.....	7	4.6	1.0
26-30.....	13	2.9	0.6	College graduate.....	5	3.3	0.6
31-35.....	13	3.1	0.4	Postgraduate.....	2	4.7	0.2
36-40.....	9	2.1	0.3	Dwelling Unit:			
Over 40.....	23	3.0	0.4	Own house.....	45	2.5	0.5
Marital Status:				Rent house.....	19	2.0	0.2
Single.....	28	2.8	2.0	Rent apartment.....	14	3.5	0.8
Married.....	58	1.3	0.3	Other.....	8	4.2	0.2
Married with children aged 8-15.....	17	3.0	0.5	Entire sample.....	86	3.2	0.8

compares favorably with the general degree of return afforded mail questionnaires, it was somewhat disappointing in view of the breakdowns of the data which were to be analyzed in the study.⁴

Attendance at Movies

The questionnaire replies received were first classified by sex, age, marital status, education, and type of dwelling unit occupied to ascertain who attends the movies in the community and in neighboring communities and their frequency of attendance. Table 1 shows the average number of times the respondents had attended the local theater and out-of-town theaters in the month preceding the survey.

⁴It should be pointed out that the sample consists of townspeople only. Whether rural patrons of the motion picture theater would show the same program preferences cannot be determined from this sample.

The figures presented for the age classifications are in keeping with previous studies of motion picture attendance. The local theater audience is predominantly young, those between 15 and 20 attending most frequently, followed by persons in the next higher age group, 21 to 25. Frequency of attendance is practically the same for males and females, a finding which is not inconsistent with the age of the audience and the sociable nature of movie attendance. Single persons visit the local theater more than twice as often as married people in general, but not quite so often as married persons whose children are more than eight years old — a phenomenon probably explained by the delightful convalescence from long years of babysitting.

In general, movie attendance does not seem to be greatly influenced by

formal education. Although the most highly educated group within the sample shows the greatest frequency of attendance, the numerical size of this group leaves the finding open to considerable doubt. Type of housing also seems to have little effect on motion picture attendance, although the figures shown in the table may provide a hint that home ownership tends to discourage movie attendance while less comfortable housing arrangements encourage relaxation at the movies. In this study, the classification "other" most often refers to trailer dwellings. Such makeshift dwelling units, especially if they house children less than eight years old, may well stimulate the 4.2 times a month visits to the local theater.

The third column in Table 1 indicates the average number of times that the persons in each classification attended an out-of-town movie in the month preceding the taking of the sample.

The data indicate that it is the younger, more restless spirits that leave for a neighboring town to attend a movie. Men attend out-of-town theaters twice as often as women, and single persons almost seven times as often as married people. No marked differences for the other classifications in regard to out-of-town movie attendance are discernible in the figures.

When the respondents were questioned as to why they did attend theaters in neighboring towns, the reason most frequently given was an understandable desire for change. The next most common answer was that the out-of-town theater provided better film

fare than that available locally. Frequently the picture currently being shown at the local theater had previously been seen elsewhere, whereas a neighboring town was offering a new film. As might be expected, the most frequent local movie goers are also the same group that visit out-of-town theaters most often—a natural consequence of multiple weekly attendance plus a limited turnover of feature films.

Other reasons included more comfortable theaters elsewhere, crowded conditions in the local house, lower admission prices in neighboring towns, and the fact that the out-of-town theaters did not show advertising films. Some write-ins mentioned more comfortable seats, better heating, and the providing of hearing aids. Thus the theme of physical comfort appeared to be important, especially for the older people.

A further breakdown of the reasons given for attending out-of-town motion picture theaters was made in order to obtain some indication of their relative importance in the eyes of the various groups of respondents. An analysis of the ranking assigned to the reasons revealed certain interesting facts. For instance, the fact that the out-of-town houses showed no advertising films except previews of coming attractions appeared only once in the ranking, although 39 percent of those who visited theaters in neighboring communities reported the absence of such films there. The wish to avoid advertising films appeared as second in importance among a small, highly educated group consisting largely of pro-

professional people. Thus it seems that only in rare instances can persons who visit out-of-town theaters be called "fugitives from commercials."

Program Preferences

Another purpose of the study was to find out what types of film the residents of a small community seem to enjoy most and to discover whether any significant relationship exists between group classification and program preference. Table 2 presents a ranking of

Table 2. Distribution of Motion Picture Types Mentioned as First, Second, and Third Choices

Type of Film	Total mentions	Order of Choice		
		First	Second	Third
Mystery.....	32	23	6	3
Comedy.....	30	15	13	2
Musical comedy	28	14	13	1
Adventure.....	25	12	8	5
War.....	17	12	2	3
Drama.....	16	9	2	5
Romance.....	14	5	9	0
Western.....	13	3	4	6
Operatic musical.....	11	6	2	3
Religious drama	11	7	2	2
Biography.....	9	2	5	2
Cartoon, full-length.....	2	0	2	0
Documentary..	0	0	0	0

thirteen types of programs based on the respondents' mentioning them as first, second, or third choices.

These data reveal that people in this small community still prefer to have their spines tingled rather than their funnybones tickled. It will be noted that mystery plots received the greatest number of mentions as first choice;

comedy and musical comedy had identical numbers of second-choice listings. As third choice for the entire sample Western pictures led, many respondents specifying musical Westerns in particular. Next to the three leading types adventure and war films received twelve mentions each as first choices. None of the replies revealed any preference for documentary films.

In order to learn whether persons in the various groups by which the data were broken down evinced different programs preferences the first, second, and third choice mentions were reclassified by age, sex, marital status, education, and dwelling unit.

Comedy appears to be best received by the younger people, except that musical comedy appeals to all age groups. Broadly speaking, older people prefer the social and emotional problems posed by drama, whereas younger theater goers favor the action type represented by mystery, adventure, and war pictures. Men prefer mystery, musical comedy, and Westerns, in that order. Among women, the first choice is equally divided between musical comedy and drama, followed by romance and comedy.

Differences in film preferences between married and unmarried respondents are minor in nature. In the breakdown by formal education it appears that as education increases the tendency is away from the more obvious conflicts of mystery and adventure toward the more subtle forms of conflict usually found in biography and drama. Musical comedy is generally popular on all educational levels but the very lowest.

Programs Disliked

Another method of determining preferences for various types of film is to learn what kinds of pictures are disliked by those who attend the theater. Table 3 ranks the same types

Table 3. Distribution of Motion Picture Types Mentioned as First, Second, and Third Most Disliked

Type of film	Total mentions	Order of dislike		
		First	Second	Third
Western.....	32	11	13	8
War.....	25	14	6	5
Operatic musical.....	24	9	11	4
Cartoon, full length.....	16	10	6	0
Mystery.....	16	10	2	4
Romance.....	16	4	6	6
Comedy.....	16	3	5	8
Documentary..	15	8	7	0
Drama.....	13	0	2	11
Musical comedy	10	1	4	5
Biography.....	9	2	5	2
Adventure.....	7	0	1	6
Religious drama	4	0	1	3

of film on the basis of how many times they were mentioned as the first, second, and third most disliked pictures. It should be noted that apparent inconsistencies are shown in the selection by certain respondent groups of one type of feature film as "most liked," while they also select the same type of film as "most disliked." The answer lies in the circumstance that feature films are presented because of their strong appeal to certain groups within the theater-attending public. Other groups, confronted with the unpleasant alternatives of either not attending a movie or traveling a considerable distance to a neighboring

community to see a different feature, seems to harbor a resentment against the offending type of film, which is particularly inflamed when showings tend to follow a recurring cycle.

Despite the recent popularity of two war pictures which were outstanding from the point of view of box-office receipts — "Sands of Iwo Jima" and "Twelve O'Clock High" — war films were selected as the most disliked type by more respondents than any other kind of picture. Next in order of disfavor were Westerns, full-length cartoons, and mysteries. In Table 2 the combination of first, second, and third choices of preferred films resulted in the same ranking for the top three types as was shown in the column of first choices. The application of that procedure to Table 3, however, gives a different result. When total mentions are used as the basis, the most disliked type appears to be Westerns, followed by war pictures and operatic musicals.

When data on disliked films were classified by respondent groups, it was found that documentaries and operatic musicals, although rarely shown in this community, were high on the list of dislikes but not among the three most strongly disliked types. Many of the respondents had never seen a documentary film, but most of them knew of such pictures as "The River" and "The Plow That Broke the Plains."

Westerns, surprisingly enough, proved extremely unpopular among all age groups. It should be remembered, however, that the sample did not include farmers, for whose special enjoyment the exhibitor shows Western pictures on Saturdays, much to the annoyance of townspeople.

High on the list of films disliked by men are mystery stories, which also appeared on their list of favorite films. Apparently, mystery films, which are normally well represented during the year, are something men can't be indifferent towards. Women probably registered their distaste for blood-and-thunder entertainment by selecting as the films they most dislike war, Western, and mystery stories, in that order.

In a decision that bodes ill for Dan Cupid, single people placed romance high on their lists of disliked themes. Had the survey been made in the spring the reputed amatory influence of that season might have changed the showing.

Education tends to influence dislikes of certain picture types, as might be expected from the manner in which it was shown to affect film preferences. That is to say, less highly educated groups tend to dislike the more subtle forms of conflict and the higher art forms—such as operatic musicals—whereas the better educated groups show greater distaste for pictures of violence and disorder, as well as for the stylized Hollywood romance.

Faced with diverse film preferences and equally strong prejudices, the small town theater operator requires the wisdom of a Solomon and the patience of a Job in providing acceptable film fare throughout the year. Too often his course is further hindered by restrictive booking policies, other disadvantageous trade practices, and the mores of organized minority groups.

The following tabulation shows the distribution of feature film showings in the sample community for the year 1949.

<i>Type of film</i>	<i>Number of showings</i>
Western	49
Drama	42
Adventure	39
Romance	30
Comedy	29
Mystery	21
Musical comedy.....	15
War.....	5
Cartoon	1
Religious drama.....	1
Documentary.....	0
Biography	0
Operatic musical.....	0

Short Subjects

The respondents were also questioned as to their preferences in short subjects and asked what types of short reels were shown too seldom and too often. These replies were analyzed to see whether there were any discernible differences in the types of short reels preferred by the various groups.

Table 4 indicates the number of times respondents expressed dissatisfaction with the length and number of showings of certain common types of

Table 4. Number of Respondents Indicating Dissatisfaction with Time Devoted to Certain Types of Short Subjects

Type of film	Theater devotes	
	Too much time	Too little time
Advertising films. . .	42	0
Coming attractions..	23	0
Sports.....	14	18
Comic cartoons.....	12	7
Hobby reels.....	11	9
Travelogs.....	10	12
Short comedies.....	8	15
Newsreels.....	0	18

short reels, because either too much or too little time was devoted to them. Most people felt that too much time was given to advertising films, coming attractions, and sport shorts, whereas the time allowed for news, sports events, and short comedies was considered inadequate. The apparent contradiction in regard to sports films is due to the sharp cleavage between the sexes as to this type of motion picture entertainment.

When these opinions as to whether the local theater devotes too much or too little to the types of short subjects listed were classified by groups, very little difference was apparent in the views on too much time. In almost every instance "coming attractions" and "advertising films" appeared among the first three mentions.

In the comments on "too little time," on the other hand, certain trends are apparent. Except for those patrons under 20 years of age, the demand for more pictorial news is pronounced. Men would like to see more time given to sports, newsreels, and short comedies, in that order, whereas women would like to have more time devoted to travelogs, short comedies, and news. The fact that married people would favor more sports, news, and short comedies, just as men do, provides somewhat meager corroboration of man's claim to be boss in his own family. Single persons expressed a desire for more short comedies, comic cartoons, and sport shorts.

The example was inadequate as a basis for comparison of the groups at the various educational levels, but the data do suggest that newsreels, sports,

and short comedies rank high in favor among the better educated respondents.

Advertising Films

In order to determine whether the showing of advertising films has an adverse effect on attendance, the question was asked: "If advertising films were not shown, would you visit your local theater (1) just as often; (2) more often; (3) less often?"

The replies indicated that 85 percent of the respondents would attend just as often, 10 percent more often, and 5 percent less often. Thus it seems that the showing of advertising films has little effect on the attendance at this motion picture theater.

When the respondents were asked whether they would be willing to pay a somewhat higher admission price at the local theater if advertising films—other than previews of coming attractions—were not shown, 91 percent replied in the negative. The 9 percent who expressed a willingness to pay more placed a ceiling of 10 cents on an acceptable advance.

In a different approach, respondents were asked whether they would find the use of advertising films less objectionable if the cost of admission were scaled down. More than three-fourths of the replies indicated that additional showings of advertising films would not be approved, even at reduced prices. Very few seemed to consider lower admissions a fair exchange for more advertising features.

Three other questions were designed to examine the general opinion in the community on the subject of advertising films. First, the respondents were asked to compare the quality of adver-

ing films with that of the other features shown at the local theater. Second, they were questioned as to their approval of or opposition to the showing of advertising films. Third, those who were opposed to the showing of these films were asked to state the basis of their opposition.

Only 3 percent of the respondents considered advertising films better than the other types shown, 53 percent thought they were on a par with the other types, and 44 percent regarded them as inferior.

Attitudes toward the showing of advertising films ranked as follows in descending order of approval:

<i>Attitude</i>	<i>Percent</i>
Strongly in favor.....	4
In favor.....	34
No opinion.....	27
Opposed.....	21
Strongly opposed.....	14

Opposition to the showing of advertising films was based on the following grounds:

<i>Objection</i>	<i>Percent</i>
Takes too long.....	22
Showing is an imposition....	21
Uninteresting presentation....	20
Not interested in products....	19
Poor photography and sound..	5
Other.....	13

The answers classified as "other" were concerned largely with resentment against the "waste of time" and with the fact that the same advertising film "runs too long without change."

Comments

The single theater in a small town has a greater public responsibility than do theaters in communities in which competitive situation exists. In many

cases, in addition to being the only source of film entertainment, the small town motion picture theater is the sole source of any commercial amusement.

Since the theater operator is usually a local resident, he is subject to more than ordinary pressure from self-seeking interest groups within the community. Moreover, he faces the difficult task of reconciling conflicting tastes in entertainment among socio-economic strata which are often as pronounced in their boundaries as similar groups in larger cities.

Another serious problem is the small size of some of the homogeneous groups within the total audience. Film fare which appeals to a more discriminating group may occasion severe financial loss. As a result, the small town theater tends to cling to stylized formats, hackneyed plots, and well-worn film personalities, cutting the smaller community off almost completely from meaningful presentations of the more serious and controversial problems.

A possible solution may be found in private showings, at an advanced price, to select groups. An enterprising theater operator might form a "film club" with a prescribed annual fee, whose membership is restricted to interested adults, for the purpose of showing significant cultural or experimental films, both foreign and domestic. The successful operation of such a club might provide a way out of the present dilemma of the small town theater operator.

Perhaps the threatened competition of more diversified television fare, rapidly becoming available to many small communities, may prove to be the necessary stimulus.

Books Reviewed

Business Cycles and National Income.

By Alvin H. Hansen (New York: W. W. Norton & Co., 1951, pp. x, 639. \$6.75)

This book should interest not only the professional economist but also the general reader interested in public economic policy. Professor Hansen enjoys an international reputation, and his views on business cycle theory and appropriate policy measures carry considerable weight. Many well-known economists have been directing their attention to the range of problems covered by *Business Cycles and National Income*, and a reading of this book will acquaint the reader with many of the important contributions that have recently been made. While much of the analysis is cast in the Keynesian mold made familiar by Hansen in previous works, he is eclectic in his willingness to incorporate ideas from the whole range of thinkers who have made contributions to this field.

This book comes as a forceful reminder that the present boom situation cannot be regarded as any more stable than previous booms (or depressions) and that we may face very different circumstances and problems before many years have passed, although of course the international situation will dictate the course of events for some time to come.

As in most of his previous work, Hansen presents his ideas in a clear and simple style, so that the non-economist should be able to follow most of the exposition without great difficulty. This reviewer does not wish to imply that this volume will be of interest to

nonprofessional readers in its entirety. However, it is conveniently organized into four main parts, and the reader should be able to find the sections of special interest to him.

Following a useful and concise summary of business cycle history in Part I, Hansen presents his version of the modern theory of income and employment, most of which will be familiar to those acquainted with his previous work. It is a clear statement of this analysis and should serve as a useful summary for students. Hansen has taken account of many of the criticisms and modifications which have been suggested for the Keynesian system.

Part III will be of primary interest to the student of business cycle theory. In it Hansen traces the development of modern theory from its origins and concludes that many of the "revolutionary" concepts introduced in recent years can be found in the work of certain 19th and early 20th century economists. This is particularly true of certain continental economists, from whose work the English-speaking theorists have been surprisingly insulated. As the author insists, the fact that many of the building blocks of modern theory are not new does nothing to detract from the achievement of synthesizing these into a useful framework of analysis.

The final section is devoted to a consideration of public policy relative to business fluctuations. Hansen not only presents his own views but includes a critical survey of many of the recommendations emanating from other sources. He emphasizes the ap

parent impossibility of a modern private enterprise system's sustaining the extremely high levels of private investment characteristic of boom periods such as the 1920's and the current postwar era. It is this instability of private investment outlays which occupies the key role in Hansen's explanation of the cycle. He argues that if our government—and the governments of the other western democracies—are to make good on the commitment to follow policies which will contribute to the maintenance of high levels of economic activity, we must adopt a multi-barrelled counter-cyclical stabilization policy. The chief reliance, in Hansen's view, should be on over-all fiscal policy, supplemented by other approaches.

For the nonmathematician this book makes a contribution by presenting some of the important research results of the econometricians in nontechnical terms, specifically in an excellent chapter by R. M. Goodwin on "Econometrics in Business Cycles."

This volume illustrates the rather remarkable development of business cycle theory in the past two decades. In 1927 Professor Hansen wrote another book in this field, *Business Cycle Theory*. A comparison of the two works dealing with the same area provides dramatic evidence not only of the author's own change of viewpoint and ideas, but of the tremendous development which has occurred in the whole field.

WILLIAM M. CAPRON

Taxes, The Public Debt, and Transfers of Income. By Donald C. Miller (Urbana: University of Illinois

Press, 1950, pp. ix, 153. \$3.00 cloth; \$2.00 paper)

The primary purpose of this volume is to determine the net effect on the distribution of income among income groups of government interest payments, on the one hand, and the taxes providing the revenue to meet these payments, on the other. The year 1945 was selected for study. The author's procedure involves separate analysis of the distribution of the tax burden among various income groups and of the distribution of interest payments among these groups; the results are then combined to provide the picture of the net transfer between income groups.

The result indicates a highly comparable degree of progressiveness in both Federal tax structure and receipt of bond interest. However, the very lowest income group (under \$1,000) received more interest than the amount of taxes which it contributed toward the payment of interest. The higher groups (\$4,000-5,000, and over \$5,000) likewise received more than they paid in taxes toward the covering of the interest payments; the middle income groups (those between \$1,000 and \$4,000) paid more than they received. The major net transfer of income was from the middle to the higher income levels; such a transfer is considered to be a deflationary influence in the economy. The high degree of correlation in progressiveness, however, between tax payments and interest receipts indicates that the significance of the transfer is not so great as is sometimes asserted.

The inevitable limitation on the usefulness of a study of this type is the

fact that actual data of distributions of tax burdens and interest receipts are not available; the distributions must be estimated, on the basis of assumptions made in regard to the incidence of tax burdens and to disposition of interest payments made to financial institutions rather than directly to individuals. The validity of the results depends upon the acceptability of the assumptions made, and must be considered in this light.

A considerable portion of this study, therefore, is taken up with the question of tax incidence. Little attempt is made to advance the analysis of incidence; the presentation of contemporary incidence theory is competent, with full recognition of the limitations of the theory. Some question may be raised about the relative neglect of the significance of oligopoly pricing practices for the shifting of the corporation income tax. With the personal income tax, the major problem of determining burden in various income levels is not that of shifting, but of the treatment of single and joint returns; this problem is considered at length. As to corporate taxes, in view of the doubts as to incidence, two assumptions are made: first, that all of the tax is borne by the stockholders; second, that one-third is shifted to consumers and the other two-thirds is borne by the stockholders. These two cases are carried through all subsequent discussions; the over-all results are not significantly different, but with the first assumption, the extent of transfer of income to the higher income levels was somewhat less than with the second, as would be expected.

Excise taxes are considered to shift to the consumer; the pattern of dis-

tribution of burden is based upon available studies of patterns of distribution of consumer expenditures.

In order to analyze the pattern of distribution of debt interest payments, the structure of debt ownership is analyzed in some detail, on the basis of Treasury data. The interest on personal holdings is assigned to individual income groups on the basis of the recent Federal Reserve studies. Allocation of the large portion of interest accruing to financial institutions is based upon careful analysis of policy holdings, of distribution of bank deposits and bank-stock ownership, and of disposition of interest earnings by the institutions. Nevertheless, the assumptions made in regard to receipts are of necessity somewhat arbitrary.

The major contribution of the study is not that of the specific results attained, but in its usefulness as an exploration of techniques which may be used to determine the net effects on income distribution of taxes and government expenditures.

JOHN F. DUNN

Russia's Soviet Economy, by Harry Schwartz (New York: Prentice-Hall, Inc., 1950, pp. xxvi, 592 \$6.65)

Although Professor Schwartz makes no effort to shroud his anti-Soviet viewpoint in the verbiage of scholarly detachment in this book, and sometimes puts the worst interpretation upon a development that might be explained in less invidious terms, he has written a readable, well-documented account of the significant aspects of the contemporary Russian economy. Since he reads Russian and reports on the

current literature of his subject regularly for the *New York Times*, he has access to original sources which few previous writers on the Soviet Union have been able to use.

The author is hampered, as all other writers on Russia are, by the Soviet government's policy of concealing much important economic data and the inadequacy of a good deal of the statistics which are published. He regards the published data as reliable, however. Failure of the government to publish a cost-of-living index in the past twenty years leads writers like Mr. Schwartz to resort to makeshift estimates of the cost of consumer purchases, based upon occasionally published prices of a limited number of food items, as sold in Moscow. The resulting index certainly does not accurately measure changes in the cost of living in Russia, leaving out, as it does and as Mr. Schwartz points out, the important items of clothing, rent, fuel, and light.

On the basis of applying this crude index to statistics of average annual earnings of Russian workers, Mr. Schwartz concludes that "never since the early 1930's has the Soviet worker's purchasing power been anywhere near the level he enjoyed in 1928."

Professor Alexander Baykov, of Birmingham University, was more cautious in treating the movement of average wages when he wrote *The Development of the Soviet Economic System*. There he showed the tremendous growth in the Russian labor force between 1928 and World War II, as Russia began to be transformed from an agricultural to an industrial economy. In this process millions of workers

were recruited from extreme underemployment in the agricultural areas (where they were not counted in the labor force), were trained to more productive jobs in industry, transport, and trade, and had their earnings markedly increased. But the addition of these low-paid workers to the labor force lowered the national average wage from what it would otherwise have been. So far as the living standards of the population are concerned, account would also have to be taken of the increased employment of women in industry, which added breadwinners to each family and raised family incomes more than individual incomes.

In many instances Mr. Schwartz employs statistical estimates of earlier writers, which have often been little more than guesswork, with the result that a spurious glow of authenticity is sometimes thrown around a patchwork of shaky approximations. The author himself points out in his preface the difficulties he encountered in this respect.

Despite the inadequacy of his statistical sources, Mr. Schwartz has been able to quote a great many figures to illustrate his description and analysis of such aspects of the Russian economy as the structure of wages, production in industry and agriculture, productivity of labor, the financial and tax systems, the availability of natural resources, and housing. He discusses the problem of prison labor with considerable restraint and points to the existence of coercion in the hiring of "free" labor, although he shows that the efforts of the Government to prevent workers from moving from job to job to better themselves have failed to a

considerable degree, and that the Government has had to use incentive wage payments similar to those found in the United States to induce workers to undertake tasks for which the need has been considered essential.

An excellent chapter on the theory and functioning of the National Economic Plan is included. The difficulties of coordinating all the myriad aspects of the national economy under the plan are discussed, and it is pointed out that the pricing of goods and productive services under the plan is a complex problem involving a difficult task of estimating costs and a considerable element of subsidization in areas of the economy deemed strategic. Chapters are also included on Foreign Economic Relations and Transportation and Communication.

The author concludes with an appendix on Fulfillment of the Fourth Five-Year Plan, in which he reveals

the rather customary result of overfulfillment of the target for the production of certain major industrial raw materials and underfulfillment of the consumer goods goal. He says that "overfulfillment of the housing construction goal is undoubtedly one of the brightest features of the Soviet economy's performance during 1946-50, though it was undoubtedly inadequate to end substantially the overcrowding of Soviet cities in postwar years."

The book is apparently not designed exclusively for economists or for students. It should interest them, but it should also appeal strongly to the nonprofessional reader who may wish to learn, relatively painlessly, the major facts about the giant new nation in Eurasia for whose containment the United States and her allies are now girding their economic and military loins.

ROLAND GIBSON